CITY OF NORMAN
Office of the Purchasing Division
Norman, Oklahoma

REQUEST FOR PROPOSAL RFP-1516-22

The City of Norman will open sealed bids in the Conference Room of Building C, City of Norman on the below listed item at 2:00 p.m. on January 15th, 2016.

PROJECT DESCRIPTION

ACCESS CONTROL SYSTEM CONSOLIDATION AND
DOOR REPLACEMENT PROJECT FOR THE MUNICIPAL BUILDING
AND FLEET MANAGEMENT GATE AND GATE MOTOR REPAIR/REPLACE.

1. Repair/replace all exterior aluminum store front doors (4 pair).
2. Remove and replace all existing Access Control System (ACS) devices in City Hall (Municipal Building). Move ACS for this building to existing Genetec System, NO SUBSTITUTIONS.
3. Repair/Replace all Gate operators and rolling gates as required at the Fleet Facility (4 locations, 7 gates).
4. Remove and replace all gate ACS and replace with existing Genetec System. NO SUBSTITUTIONS.
5. Complete all work in accordance with bid specifications and contract documents.

All bids must be in the Office of the Purchasing Division, 201-C West Gray Street, Norman, Oklahoma, 73069, BEFORE THE FINAL CLOSING HOUR as shown on the Invitation to Bid. If bid is mailed, to be considered it should be addressed as follows: Attention: Purchasing Department, Opening of Bids, City of Norman, P. O. Box 370, Norman, Oklahoma, 73070. In addition, the bid envelope should be plainly marked on both sides indicating the bid number. ALL BIDS DELIVERED OR MAILED SHALL BE RECEIVED BEFORE THE FINAL CLOSING HOUR.

All bid amounts must be the final price. No additional costs will be allowed for these proposals. To receive consideration, bids must be submitted on the City of Norman "Form for Bidders" and "Bidders Proposal" (if applicable), which are hereby made part of this Invitation to Bid. In addition, a Bid Bond of 5% must accompany the bid.

No bidder may withdraw his/her bid within sixty (60) days after the date of bid opening stated above. The Owner reserves the right to reject any and all bids or to waive any formalities or irregularities in the bidding process.

Alternate bids may be considered. If bidding an alternate, so state on the face of the Form for Bidders and fully describe the merchandise and include Manufacturer's literature. Unless the bidder identifies on the Form for Bidders that an alternate is being bid, the vendor will be expected to deliver service as specified. Alternate bids shall not be submitted to circumvent the specifications.

The Affairs of the City of Norman, whether in the conduct of its governmental or proprietary functions, involve the health, safety and welfare of the public; and because the item(s) specified are necessary and proper for the conduct of said affairs, any delay in service can jeopardize the health, safety and welfare of the public, and can result in the incurring of additional expenses to the City.

Use ink pen or typewriter in filling in quotation and initial any corrections. Bid and Affidavit must be signed in ink by an authorized representative of the company making the bid. Bidders should

submit one original and three duplicate Form for Bidders and Proposals. All bids will be awarded by Section or Sections whichever is in the best interest of the City. Any bidder who fails to return the third consecutive invitation will be removed from the bid list. If the above procedures are not followed, bids may be disqualified. The right is reserved by the City to reject any or all bids or parts of bids. All bids are public records and are available during regular office hours.

CITY OF NORMAN
Office of the Purchasing Agent
Norman, Oklahoma

FORM FOR BIDDERS NO. 1516-22

Opening of Bids
City of Norman
Purchasing
PO Box 370
Norman, Oklahoma 73070

Bid Opening
2:00 P.M.
January 13, 2016

Dear Sir:

The undersigned bidder declares that before preparing this bid he read carefully the detailed specifications and that his bid is made with full knowledge of the kind, quality, and quantity of the materials or services to be furnished.

The undersigned bidder offers and proposes to furnish all materials, equipment, or other services necessary to provide complete and working systems hereinafter set forth, in the manner and under the conditions and in accordance with the specifications on file in the Office of the Purchasing Agent.

Removal & disposal of current Access Control System (ACS) for City Hall/Fleet Maintenance including all existing wiring for these systems. As specified in NFPA 70, 2009

Base Bid Remove/Replace all ACS for City Hall $_____

Base Bid Remove/Replace all ACS for Fleet Management and CNG $_____

Base Bid Door and Lock Repair/Replace City Hall $_____

Base Bid New Gate Operators and Chain Link Gates Fleet Yard $_____

Base Bid New Fiber underground to 3 Fleet Gate locations from Line Maintenance I.T. room $_____

Alternate Bid #1 City Hall, encode all existing cameras to existing Video Management Software (VMS) $_____

Alternate Bid #2 City Hall, add ACS equipment to three new Doors Including new locking hardware $_____

Alternate Bid #1 Fleet, add IP intercom stations to all gates $_____

Alternate Bid #2 Fleet, add new ACS to single door in Fleet office, include New electric locking hardware $_____

Alternate Bid #3 Fleet, Encode all existing video from three DVR's to Existing VMS $_____

AFFIDAVIT OF NON-COLLUSION

STATE OF _____)

COUNTY OF_____)ss

_____, of lawful age, being first duly sworn, on oath says, that (s)he is the agent authorized by the bidder to submit the attached bid. Affidavit further states that the bidder has not been a party to any collusion among bidders in restraint to freedom of competition by agreement to bid at a fixed price or to refrain from bidding; or with any city official or employee as to quantity, quality, or price in the prospective contract, or any other terms of prospective contract; or in any discussion between bidders and any city official concerning exchange of money or other thing of value for special consideration in the letting of a contract; that the bidder/contractor has not paid, given or donated or agreed to pay, give or donate to any officer or employee of the City of Norman, Oklahoma any money or other thing of value, either directly or indirectly, in the procuring of the award of a contract pursuant to this bid.

_____
Bidder
By:_____

Subscribed and sworn to before me on this _____ day of _____, 20_____

_____ My Commission Expires_____
NOTARY PUBLIC

Billing/Payment Language

Contractor shall receive payment for completed work at:

- 25%, all cabling installed and tested (example).
- 50%, all equipment is installed and tested for proper operation (example).
- 75%, all programming for systems testing is complete (example).
- 100%, all testing and training is complete. All systems including any alternate projects are 100% complete and accepted by the City of Norman PM and the City of Norman Security Consultant.

  Percentage complete will be determined by the project manager who has sole authority in this matter. Percentage values will be negotiated after contract award, between the the PM and all contractors.

Compliance with Applicable Laws and City Rules

The contractor covenants and agrees that he and his agents and employees will comply with all municipal, state and federal laws, rules and regulations applicable to the business to be conducted under this agreement. A complete list of licensed technicians and copies of their current Oklahoma State Licenses will be provided to the City of Norman PM after contract award.

The contractor shall provide a list to the city of Norman Project Manager (PM) of the names and addresses of all employees and the positions of said employees who perform the duties outlined in this agreement. The contractor must provide adequate and qualified supervisory personnel to perform the obligation of the contract. All employees shall be paid no less than the current Federal minimum wage in accordance with all Davis Bacon language for Norman Oklahoma. Certified payroll will be available for the City of Norman PM on a monthly basis if requested.

Purchasing of Materials

The contractor shall furnish all materials and supplies necessary to properly perform under this agreement. A list of all materials to be used shall be submitted to City of Norman PM for prior approval and Shop Drawings will also be provided to the City of Norman PM for approval. The City of Norman PM shall have the privilege of accepting or rejecting any product or materials used by the contractor.

The City shall complete payment to the CONTRACTOR within 30 days of invoice receipt.

Materials and/or services purchased by CONTRACTOR in connection with the City project shall be subject to the payment of City sales tax. If the CONTRACTOR is appointed to be an agent of the City by City Council resolution, thereby exempting material purchases for the project from the payment of City sales tax, CONTRACTOR shall certify, in writing, on the copy of the invoice or sales ticket to be retained by said CONTRACTOR that the purchases are made for and on behalf of the City in accordance with 68 O.S. 1356, paragraph 10.

Insurance and Bond Requirements

Liability and Property Damage Insurance:

The contractor assumes all risks incident to or in connection with its purpose to be conducted herein under and shall indemnify, defend and save the City of Norman harmless from damage or injuries of whatever nature or kind to persons or property arising directly or indirectly out of the contractor's operations and arising from acts or omissions of his employees and shall indemnify, defend and save harmless the City of Norman from any penalties for violation of any law, ordinance or regulation affecting or having application to said operation or resulting from the carelessness, negligence or improper conduct of contractor or any of his agents or employees.

In the connection therewith, the contractor shall carry insurance in the following types and amounts:

a. Workers' Compensation – The contractor shall provide coverage for its employees with statutory worker's compensation limits, and no less than $1,000,000.00 for Employers' Liability. Said coverage shall include a waiver of subrogation in favor of the City and its agents, employees and officials.

b. Commercial General Liability – The contractor shall provide coverage for all operations including, but not limited to Contractual, Products and Completed Operations, and Personal Injury. The limits shall be no less than $125,000.00 per occurrence, with a $1,000,000.00 aggregate.

c. Professional Liability (Errors & Omissions) – The contractor shall provide coverage for all claims arising out of the services performed with limits not less than $1,000,000.00 per claim. The aggregate limit shall either apply separately to this contract or shall be at least twice the required per claim.

The insurance policies shall be issued by a company approved by the City of Norman. The City shall be furnished with a Certificate of Insurance which shall provide that such insurance shall not be changed or cancelled without ten (10) days prior written notice to the City of Norman. Certificates of Insurance shall be delivered to the City of Norman prior to the commencement of the agreement. THE POLICY SHALL LIST THE CITY OF NORMAN AS 'CO-INSURED' OR 'ADDITIONAL INSURED.'

The contractor shall furnish the City with a certificate of insurance as proof that the insurance herein described has been obtained. All insurance costs are to be paid by the contractor.

Performance, Statutory, and Maintenance Bonds

The contractor does hereby warrant and/or guarantee against and shall remedy any defect due to faulty materials or workmanship and shall pay for any damages to other work resulting there/from, which may appear within a period of two (2) years from the date of completion as evidenced by the date of the final acceptance of the project by the project manager.

The contractor shall provide a maintenance bond with sufficient sureties to be approved by the owner in the sum equal to the contract sum. The contractor shall use the enclosed contract forms for submission: Performance, Statutory and Maintenance Bonds. Three original copies of each shall be submitted along with Power of Attorney.

Pre Bid Requirements

MANDATORY SITE VISIT (THIS IS NOT OPTIONAL)

Shall be held at the site of construction on Friday, December 18, 2015, where the names of potential bidders shall be recorded, no bids shall be accepted from contractors that fail to come to the site walks for these locations listed.

BASIS OF BID

The bidder must include all Base Bid cost items that are required for their systems to operate and all alternatives shown on the Bid Forms. Example:

- Contractor Base bid for ACS would include all wiring, fiber, communications other than network switch ports by customer. All Genetec equipment, all card readers, request to exit devices, door contacts, equipment cabinets, low voltage power, all patch cables, tamper proof screws, all coordination with other trades to power your equipment on install underground pathways and fiber if it does not exist currently. Doors and Door locking hardware by others. Find a sub-contractor to help you if you need concrete or site locates for existing underground utilities. All trades will be at the bid walk. It is up to you to partner with the trades you need to do your job.

Failure to comply may be cause for rejection. Conditional bids will not be accepted.

MEASUREMENTS

Before ordering material or doing any work, the contractor shall verify all measurements and quantities of material at the project and shall be responsible for the correctness of same. No extra charge or compensation shall be allowed on account of difference between actual quantities and/or dimensions implied by this contract. Actual quantities of materials required for the project is the responsibility of the contractor.

Interpretation and Questions

All questions relating to this bid document must be in writing and hand-delivered or delivered electronically through email or fax to PM no later than seven (7) days prior to the date of the bid opening specified in this document. Any interpretations, clarifications, or changes will be made in the form of written addenda issued by the PM. Any oral communications will not be authoritative and will not be binding on the City. It remains the sole responsibility of the contractor to contact the PM prior to submitting a proposal to ascertain if any addenda have been issued, to obtain all such addenda, and to return executed addenda with each proposal.

All questions may be addressed to:

Stacey Baker, Sr. Project Manager Electronic Safety and Security projects
201 West Gray St. Bldg. C
Norman, Oklahoma 73069
Phone: (405) 217-7747
Email: Stacey.baker@normanok.gov

Joe Barry, Sr. Systems Designer/Security Consultant for ESS
201 West Gray St. Bldg. C
Norman, OK 73069
Phone: (405) 919-7440
Email: joe.barry@rossengr.com

Obligation of Bidder

At the time of the opening of bids, each Bidder will be presumed to have inspected the site and to have read and to be thoroughly familiar with the contract documents (including all Addenda). The failure or omission of any Bidder to examine any form, instrument, or documents shall in no way relieve any bidder from any obligation in respect of his bid.

Time of Completion

Project's shall run concurrent. No work stoppage is allowed between the projects.

Owner shall issue a "Notice to Proceed" within Ten (10) days after Contractor submits satisfactory bonds and proof of insurance and has approval from City Council to proceed with the project. Contractor will at the time of receiving said notice to proceed, shall have Ten (10) days to physically begin the project and will complete all work, within the time frame stipulated.

Building functions shall not be interrupted.

HAZARDOUS MATERIALS

No materials containing asbestos shall be used.

City Of Norman RFP Bid Items	Date
RFP posted to City of Norman, OK website	December 9th, 2015
RFP advertised in Norman Transcript	December 11th– 25th, 2015
Mandatory onsite meeting to be eligible for response consideration	December 18th, 2015 at 9:00 am or December 30th, 2015 at 9:00 am – meeting location for both dates will be 1301 DaVinci St, Norman OK. Please park on the North side of the maintenance building. City of Norman will have representatives on site to meet you. You only need to attend one of the meetings to be eligible to bid on the project.
Questions will be NOT be accepted after	January 6th, 2016 at 5:00pm
Responses to RFP Due	January 15th, 2016 – none will be accepted after 2:00 pm (includes email, postal delivery, or in person drop-offs)
Vendor selection and notification of intent to proceed	January 21st, 2016
Target date for Contract presentation to Council	February 9th, 2016
Target date for selected vendor to start project	February 10th, 2016
Target date for completion	April 10th, 2016

END OF INSTRUCTION TO BIDDERS

SCOPE OF WORK/SPECIFICATIONS/CONTRACT DOCUMENTS

SCOPE OF WORK

CITY HALL MUNICIPAL BUILDING ACS

FLEET MANAGEMENT FACILITIES AND CNG STATION ACS

DIVISION 08 – OPENINGS

081000 – DOORS AND FRAMES

087000 – HARDWARE

DIVISION 26 – ELECTRICAL

260500 – COMMON WORK RESULTS FOR ELECTRICAL

DIVISION 27 - COMMUNICATIONS

270500 – COMMON WORK RESULTS FOR COMMUNICATIONS

278201 – UNDERGROUND DUCTS AND MAINTENANCE HOLES FOR COMMUNICATIONS SYSTEMS

DIVISION 28 – ELECTRONIC ACCESS CONTROL AND VIDEO SURVAILENCE SYSTEM

280513 – CONDUCTORS AND CABLES FOR ELECTRONIC SAFETY AND SECURITY

280544 - SLEEVES AND SLEEVE SEALS FOR ELECTRONIC SAFETY AND SECURITY PATHWAYS AND CABLING

283100 – ACCESS CONTROL

283101 - UNIFIED ELECTRONIC ACS AND VSS

DIVISION 32 FENCES AND GATES

323113 CHAINLINK FENCES AND GATES

324000 MOTORIZED GATE OPERATORS

CONTRACT

MAINTENANCE BOND

PERFORMANCE BOND

STATUTORY BOND

AFFIDAVIT

SCOPE OF WORK

CITY HALL MUNICIPAL BUILDING

The City Hall Municipal Facility is a complete remove and replace project. All Access Control Systems (ACS) will be removed and replaced with new systems and infrastructure per attached specifications, drawings and documents. The following is a brief description of the items that will be addressed in this project (refer to contract drawings/specifications and contract documents provided for full details):

- Remove all old cabling from building 201C and City Hall for the existing City Hall ACS.
- All magnetic locks will be removed from City Hall facility
- Install all new cable for the ACS in City Hall
- All exterior aluminum store front double doors will be replaced with new doors and a new center mullion will be installed for new locking hardware (8 doors total).
- All existing electric strikes will be removed and replaced with new DC feather quite electric strikes.
- Exterior single doors will receive new locking hardware, 3 steel doors
- New ACS equipment will be installed in the existing City Hall IT closet.
- New ACS will be added to existing Genetec ACS software
- Three new doors will be added to the system if budget allows (Alternate #2)
- Existing cameras will be encoded to the existing Genetex VMS (Alternate #1). Remove DVR and return to the PM.
- Existing Genetec ACS and VMS configurations shall be evaluated with the successful bidder a single platform and virtualize all server configurations shall be discussed. Work with City IT to accomplish this. Discuss using existing SQL licenses provided by The City of Norman for all database usage.
- All new ACS and VMS will be added to new ACS/VMS configurations discussed above

FLEET MANAGEMENT FACILITIES AND CNG STATION

This Facility is a campus site that consists of multiple buildings, two fuel stations and a parking lot that is detached from the footprint of the main Fleet Facility.

The Base contract is for ACS only, they currently have four gate locations using the Fuel Man system to gain access and open gates. The work for the new ACS will include the following (refer to contract drawings/specifications and contract documents provided for full details):

- Remove and replace all existing gate motors as needed.
- Repair or replace 3 double slide chain-link cantilever rolling gates and one single wood sliding gate. The single gate is the newest of all gates and should be reusable, this will be up to the contractor because of warrantee and guarantee requirements in the contract.
- Provide fiber from Line maintenance IT room to the 3 double gate ACS control cabinets (NEW).
- Provide all new ACS equipment including new single height pedestals at all four gate locations
- Provide new IP hands free phones at all 4 gate locations. Mount to same face plate as the new card readers (Alternate #1)
- Provide a single interior door with ACS, this is a new location and will need new electric locking hardware (Alternate #2). This door restricts access from the shop area into the Fleet Managers front office area. No floor plans for this location are available at this time.
- Provide encoders for North CNG facilities DVR, the DVR in the Fleet Managers Office and the DVR in the Line Maintenance IT room. Remove DVRS and migrate all video and control into the existing Genetec VMS. Provide access to the VMS in Fleet Managers office (Alternate #3).

DIVISION 08 – OPENINGS

08 10 00 – DOORS AND FRAMES

CITY HALL EXTERIOR DOUBLE DOORS

STOREFRONT ENTRANCES: (6’4” X 7’11” Openings) Each Opening:
Frames: Trulite CS450 Series Frames 2” x 4.5” Dark Bronze Anodized Finish.

Doors: Trulite 500 Series 5” wide Stile, 5.5” top Rail. 10” Bottom Rail, W/Pile Astragal, Dark Bronze Anodized Finish. Pair 3’0 x 7’9”

Glass: Trulite ¼” Clear Tempered glass.

Key Removable Mullions: Von Duprin KR9854 x 1) 449 Strike x 6300 ES x quick disconnect.
Hinges: Select SL 11 BR HD x 92” Full Mortise Continuous Hinge Dark Bronze Finish

08 70 00 – HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Mechanical door hardware for the following:
   a. Swinging doors.

2. Electrified door hardware.
3. Section 281300 "Access Control" for access control devices installed at door openings and provided as part of a security system.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Details of electrified door hardware, indicating the following:

1. Wiring Diagrams: For power, signal, and control wiring and including the following:

   a. Details of interface of electrified door hardware and building safety ACS.
   b. Schematic diagram of systems that interface with electrified door hardware.
   c. Point-to-point wiring. Security Contractor will provide these in shop drawings for approval
   d. Risers.

2. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: From Installer, Hardware Consultant and ACS provider.

B. Product Certificates: For electrified door hardware, from the manufacturer. UL 294

1. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.

C. Product Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.

D. Warranty: Special warranty specified in this Section.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware and keying schedule.

1.6 MATERIAL SUBMITTALS

A. Furnish materials that match products installed.

1. Door Hardware: Exit Device:

- Von Duprin 99 NLOP 3’ x 313 Finish x RHRA.
- Cylinders: 1) Corbin 7 PIN Mortise Cylinder for the KR Mullion US10B
- Cylinders: 1) Rim Cylinder for the RIM Panic device RHR US10B (Match Owners Keyway)
- Pulls: Rockwood BF158” 12” offset pullsUS10B

2. Electrical Parts: <Insert detailed descriptions and specific numbers of units>.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Approved Supplier of products and an employer of workers trained and approved by product manufacturers and accepted by Owner for door hardware and keying.

1. Warehousing Facilities: In 45 minutes of Project's vicinity.
2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Source Limitations: Obtain each type of door hardware from a single manufacturer.

1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

C. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, unless otherwise indicated.

D. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meet requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.

1. Air Leakage Rate: Maximum air leakage of0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at the tested pressure differential of 0.3-inch wg (75 Pa) of water.

E. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

F. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

G. Accessibility Requirements: Comply with applicable provisions in the DOJ's 2010 ADA Standards for Accessible Design. Both existing doors in City Hall will reuse existing ADA openers. ADA operator/closer (2) “Existing” LCN 4642 auto equalizer and controls DKB (695) RHRA.
1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
2. Bevel raised thresholds, NGP 425 Saddle, 5” x 72” x ½” AL
3. Closers: Adjust door closer sweep periods so that, from an open position of 90 degrees, the time required to move the door to a position of 12 degrees from the latch is 5 seconds. LCN 4040XP-3077 EDA DKB (695)
4. Hinges: Adjust door hinges so that, from an open position of 70 degrees, the time required to move the door to the closed position is 1.5 seconds. SL 11 BR HD x 92” Full Mortise Continuous Hinge Dark Bronze Finish.
5. Sweeps: NGP 200NDKB sweeps x 36”

H. Keying Conference: Owner PM shall conduct conference at Project site, include Door Hardware Installer's, Owner's security consultant and ACS provider. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:

1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
2. Preliminary key system schematic diagram.
3. Requirements for Access Control System.
4. Address for delivery of keys.

I. Pre-installation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Inspect and discuss preparatory work performed by other trades.
3. Inspect and discuss electrical roughing-in for electrified door hardware.
4. Review sequence of operation for each type of electrified door hardware.
5. Review required testing, inspecting, and certifying procedures.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Door Hardware contractor shall be responsible for the security of all door hardware until acceptance by the owner or the owner’s representative or PM. No door hardware shall be stored at the construction location.

B. All doors/openings shall be secured ever day before the contractor leaves. If this is not in place a guard will be hired and charged to the door contractor.

1.9 COORDINATION

A. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

B. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant and site PM.

C. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and ACS.

D. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including excessive deflection, cracking, or breakage.
b. Faulty operation of doors and door hardware.
c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.

a. Electric strike Locks: Three years from date of Substantial Completion.
b. Exit Devices: Three years from date of Substantial Completion.
c. Manual Closers: Three years from date of Substantial Completion.

1.11 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

B. Maintenance Service: Beginning at Substantial Completion, provide one-year full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door and door hardware operation. Provide parts and supplies that are the same as those used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. Provide door hardware for each door as scheduled in this section of the specifications and in the provided shop drawings from the door hardware contractor to comply with requirements in this Section.

1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products.
2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated. Coordinate final operation with the ACS contractor and the Cities PM.

B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by using door hardware designations, as follows:

1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Schedule" Article.
2. References to BHMA Designations: Provide products complying with these designations and requirements for description, quality, and function.

2.2 HINGES

A. Hinges: SL 11 BR HD x 92” Full Mortise Continuous Hinge Dark Bronze Finish

2.3 ELECTRIC LOCKS

A. Removable Mullion: Corbin 7 PIN Mortise Cylinder Mullion US10B (Match Owners Keyway)

B. Rim Cylinder (for RIM panic): RHR US10B (Match Owners Keyway)

C. Electric Strikes: Von Duprin 6300 on the RHR door US10B, exterior doors.

D. Electric Strikes: HES 1006 x Face Plate, interior office doors.

2.4 EXIT DEVICES AND AUXILIARY ITEMS

A. Exit Device
1. Von Duprin 99 NLOP x 3’ x 313 Finish x RHRA
2. Von Duprin 99 EO x 3’ x 313 Finish x LHR
3. Von Duprin EL99 NLOP x 3’ x 313

2.5 LOCK CYLINDERS

A. Lock Cylinders: Corbin 7 pin

2.6 KEYING

A. Keys: Match City of Norman keying

1. City of Norman will provide some of the cores. This will be coordinated with Facilities maintenance group before construction begins.

2.7 SURFACE CLOSERS

A. Surface Closers: Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force. Exterior: LCN 4040XP – 3077 EDA DKB (695), Interior: LCN 4040XP – 3077/62A DKB (695)

2.8 DOOR GASKETING

A. Door Gasketing: Air leakage not to exceed 0.50 cfm per foot of crack length for gasketing with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

2.9 THRESHOLDS

A. Thresholds: NGP 425 Saddle 5” x 72” x ½” AL

2.10 FABRICATION

A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved.

1. Manufacturer's identification is permitted on rim of lock cylinders only.

B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.

C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Fire-Rated Applications:

a. Machine Screws: For the following:

1) Hinges mortised to doors or frames; use threaded-to-the-head screws for doors and frames.
2) Strike plates to frames.
3) Closers to doors and frames.

b. Steel Through Bolts: For the following unless door blocking is provided:

1) Surface hinges to doors.

2) Closers to doors and frames.
3) Surface-mounted exit devices.

3. Spacers or Sex Bolts: For through bolting of hollow-metal doors. (all of these currently installed on doors with Magnetic locks shall be removed and the doors shall be repaired back to a state where the opening looks like new.
4. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.11 FINISHES

A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.

3.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Custom Steel Doors and Frames: HMMA 831.

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

C. Hinges: Install types and in quantities indicated in approved specifications and drawings.

D. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

E. Boxed Power Supplies: Locate power supplies as indicated or, in equipment room. Verify location with ACS designer.

1. Configuration: Provide power supplies as specified in drawings and specifications.

F. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified.

G. Stops: Provide new center mullions for all exterior double doors (4 sets total).

H. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

I. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

J. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 FIELD QUALITY CONTROL

A. Independent Consultant: Owner will engage a qualified independent Consultant to perform inspections and to prepare inspection reports.

1. Independent Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three months after date of Substantial Completion, Door Hardware Installer's shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.6 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes.

3.8 DOOR HARDWARE SCHEDULE

A. DOOR #1, #7, #12: Interior hollow metal door from City Hall into building 201C.
1. (1) New Exit Device, EL99 NLOP x 3’ x 313
2. (1) New Closer, LCN 4040XP – 3049
3. (1) Rim Cylinder for the Rim Panic device RHR US10B (Match owners Keyway)
4. (1) Von Duprin 6300 Electric Strike on the RHR door US10B
5. Repair steel door and Jamb holes and paint to match.

B. Door #2, #8, #14, #15: East Exterior Aluminum Store Front Doors (replace the pair)
1. (1) New Trulite CS450 Series Frames 2” x 4.5” Dark Bronze Anodized Finish
2. (2) New Trulite 500 Series 5” wide Stile, 5.5” top Rail. Bottom Rail, W/Pile Astragal, Dark Bronze Anodized Finish. Pair 3’0” x 7’9”
3. (2) Glass Trulite ¼” Clear Tempered glass.
4. (1) Key Removable Mullion, Von Duprin KR9854 x 1-449 strike x 6300 ES x quick disconnect
5. (2) Hinges, Select SL 11 BR HD x 92” Full mortise Continuous Hinge Dark Bronze Finish
6. (1) Exit Device, Von Duprin 99 NLOP x 3’ x 313 Finish x RHRA
7. (1) Exit Device, Von Duprin 99 EO x 3’ x 313 Finish x LHR
8. (1) Cylinder, Corbin 7 Pin Mortise for the KR Mullion US10B
9. (2) Pulls Rockwood BF158” 12” offset pulls US10B
10. (2) Closer, LCN 4040XP – 3077 EDA DKB (695)
11. (2) Sweeps, NGP 200NDKB Sweeps x 36”
12. (1) Threshold, NGP 425 Saddle threshold 5” x 72” x ½” AL

****Door #8 and #15 will reuse their existing ADA operator/closer, LCN 4642 auto equalizer and controls DKB (695) RHRA. Door hardware contractor will be responsible for coordination with the access control contractor to make sure all new wiring is installed in door framing and wired to the ADA operator correctly for the new locking hardware and operator controls.

C. Door #3, #4, #5, #6, #9, #10, #11, #13
1. (1) Electric Strike, HES 1006 x J Face Plate
2. (1) Closer, LCN 4040XP – 3077/63PA DKB (695)

****Repair all damage to doors when the existing locks are removed

****The Door hardware installation contractor will repair all holes in the frames and doors. This will include but not limited to filling holes, grinding, sanding, filler, painting.

****Any damage from the installation of the new door hardware shall be repaired at the installers expense.

END OF SECTION 087100

DIVISION 26 – ELECTRICAL

260500 – COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

The electrical work included in all other divisions is the responsibility of the contractor performing the division 26 work unless noted otherwise.

PROJECT OVERVIEW

Contractor will need to provide electrical outlets as needed for the City Hall projects. Power is available from the UPS/ Generator. Provide power to news ACS cabinet as shown on the drawings and as needed to power all new locks and ACS equipment.

Contractor will need to provide the correct voltage electrical power for the new cabinets at each Gate location for Fleet. Power already exists at each gate location for the motors. Coordinate with Gate/Fence contractor to provide power to all the new ACS equipment located at the gates.
ACS contractor will need to provide proper power for new ACS cabinet to be located in the Line Maintenance IT room.

SCOPE
The work under this section includes basic electrical requirements, which are applicable to all Division 26 sections. This section includes information common to two or more technical specification sections or items that are of a general nature, not conveniently fitting into other technical sections. Included are the following topics:

PART 1 – GENERAL

PART 2 – PRODUCTS

PART 3 - EXECUTION

RELATED WORK
REFERENCE STANDARDS
Abbreviations of standards organizations referenced in this and other sections are as follows:
ANSI American National Standards Institute
ASTM American Society for Testing and Materials
EPA Environmental Protection Agency
ETL Electrical Testing Laboratories, Inc.
IEEE Institute of Electrical and Electronics Engineers
IES Illuminating Engineering Society
ISA Instrument Society of America
NBS National Bureau of Standards
NEC National Electric Code
NEMA National Electrical Manufacturers Association
NESC National Electrical Safety Code
NFPA National Fire Protection Association
UL Underwriters Laboratories Inc.

REGULATORY REQUIREMENTS
All work and materials are to conform in every detail to applicable rules and requirements of the, National Electrical Code (NFPA 70), other applicable National Fire Protection Association codes, the National Electrical Safety Code, and present manufacturing standards (including NEMA).

All Division 26 work shall be done under the direction of a currently licensed OKLAHOMA ELECTRICAL CONTRACTOR.

QUALITY ASSURANCE
Where equipment or accessories are used which differ in arrangement, configuration, dimensions, ratings, or engineering parameters from those indicated on the contract documents, the contractor is responsible for all costs involved in integrating the equipment or accessories into the system and the assigned space, and for obtaining the performance from the system into which these items are placed.

Manufacturer references used herein are intended to establish a level of quality and performance requirements unless more explicit restrictions are stated to apply.

All materials, except medium voltage equipment and components, shall be listed by and shall bear the label of an approved electrical testing laboratory. If none of the approved electrical testing laboratories has published standards for a particular item, then other national independent testing standards, if available, applicable, and approved by AHJ, shall apply and such items shall bear those labels. Where one of the approved electrical testing laboratories has an applicable system listing and label, the entire system, except for medium voltage equipment and components, shall be so labeled.

CONTINUITY OF EXISTING SERVICES AND SYSTEMS
No outages shall be permitted on existing systems except at the time and during the interval specified by the user agency and by the Project Manager. The institution may require written approval. Any outage must be scheduled when the interruption causes the least interference with normal institutional schedules and business routines. No extra costs will be paid to the Contractor for such outages which must occur outside of regular weekly working hours.

This Contractor shall restore any circuit interrupted as a result of this work to proper operation as soon as possible. Note that institutional operations are on a seven-day week schedule.

PROTECTION OF FINISHED SURFACES
Furnish one can of touch-up paint for each different color factory finish furnished by the Contractor. Deliver touch-up paint with other "loose and detachable parts" as covered in the General Requirements.

APPROVED ELECTRICAL TESTING LABORATORIES
The following laboratories are approved for providing electrical product safety testing and listing services as required in these specifications:

Underwriters Laboratories Inc.
Electrical Testing Laboratories, Inc.

SLEEVES AND OPENINGS
Refer to Division 28, General Requirements, Sleeves and Sleeve Seals for Electronic Safety and Security.

SEALING AND FIRE STOPPING
Sealing and fire stopping of sleeves/openings between conduits, cable trays, wireways, troughs, cable bus, bus duct etc. and the sleeve, structural or partition opening shall be the responsibility of the contractor whose work penetrates the opening. Provide all fire stopping of fire rated penetrations and sealing of smoke rated penetrations in compliance with NFPA Fire Stopping and Hilti assemblies for sealing of openings.

STATE AND/OR USER AGENCY FURNISHED EQUIPMENT

This notice is to inform all contractors that this project will be accomplished by multiple sub – contractors. Coordination is the responsibility of all contractors.

Contractors that provide a complete bid with all trades under a single contractor will be considered first as complete before multiple contracts.

PROVISIONS FOR FUTURE WORK

All power supplies attached to ACS enclosures will be sized to power a complete cabinet not just to supply the current design. Any undersized power supplies will be replaced at the contractor’s expense.

INTENT
The Contractor shall furnish and install all the necessary materials, apparatus, and devices to complete the electrical equipment and systems installation herein specified, except such parts as are specifically exempted herein.

If an item is either called for in the specifications or shown on the plans, it shall be considered sufficient for the inclusion of said item in this contract. If a conflict exists within the Specifications or exists within the Drawings, the Contractor shall furnish the item, system, or workmanship, which is the highest quality, largest, or most closely fits the intent (as determined by the Project Manager). Refer to the Scope of Work of the Contract for further clarification.

It must be understood that the details and drawings are diagrammatic. The Contractor shall verify all dimensions at the site and be responsible for their accuracy.

All sizes as given are minimum except as noted.

Materials and labor shall be new (unless noted or stated otherwise), first class, and workmanlike, and shall be subject at all times to the PM and/or City of Norman inspections, tests and approval from the commencement until the acceptance of the completed work.

Whenever a particular manufacturer's product is named, it is intended to establish a level of quality and performance requirements unless more explicit restrictions are stated to apply.

OMISSIONS
No later than ten (10) days before bid opening, the Contractor shall call the attention of the PM or City of Norman to any materials or apparatus the Contractor believes to be inadequate and to any necessary items of work omitted.

SUBMITTALS
Submit for all equipment and systems as indicated in the respective specification sections, marking each submittal with that specification section number. Mark general catalog sheets and drawings to indicate specific items being submitted and proper identification of equipment by name and/or number, as indicated in the contract documents. Failure to do this may result in the submittal(s) being returned to the Contractor for correction and resubmission. Failing to follow these instructions does not relieve the Contractor from the requirement of meeting the project schedule.

On request from the PM, the successful bidder shall furnish additional drawings, illustrations, catalog data, performance characteristics, etc.

Submittals shall be grouped to include complete submittals of related systems, products, and accessories in a single submittal. Mark dimensions and values in units to match those specified. Include wiring diagrams of electrically powered equipment.

The submittals must be approved before fabrication is authorized.

Submit sufficient quantities of submittals to allow the following distribution:

Operating and Maintenance Manuals	2 copies
User agency	5 copy
PM	1 copy
City of Norman	1 copy

PROJECT/SITE CONDITIONS

Fleet Facility is an active traffic area and special safety precautions will need to be followed when working in the active traffic lanes. Safety vests will be worn at all times, traffic control safety person to watch for and direct traffic. If the gate areas have to close because of the work scheduled it will need to be scheduled with Fleet management 5 days prior to any work.

Install Work in locations shown on drawings, unless prevented by project conditions.

Prepare drawings showing proposed rearrangement of work to meet project conditions, including changes to work specified in other sections. Obtain permission of Fleet Management and the PM before proceeding.

Tools, materials and equipment shall be confined to areas designated by the PM and user agency.

WORK SEQUENCE AND SCHEDULING
Install work to accommodate Fleet requirements. During the construction period coordinate schedule and operations with PM and Fleet Representative.

WORK BY OTHER TRADES
Every attempt has been made to indicate in this trade's specifications and drawings all work required of this Contractor. However, there may be additional specific paragraphs in other trade specifications and addenda, and additional notes on drawings for other trades which pertain to this trade's work, and thus those additional requirements are hereby made a part of these specifications and drawings.

Electrical details on drawings for equipment to be provided by others are based on preliminary design data only. This Contractor shall lay out the electrical work and shall be responsible for its correctness to match equipment actually provided by others.

OFFSITE STORAGE
Prior approval by PM and the Security Designer will be needed. The contractor shall submit Storage Proof of Insurance in an amount to cover all loss of equipment and time for consideration of off-site materials storage. In general, building wire, conduit, fittings and similar rough-in material will not be accepted for off-site storage. No material will be accepted for off-site storage unless shop drawings for the material have been approved.

SALVAGE MATERIALS
No materials shall be removed from this project or shall be reused. All materials that are removed shall become the property of and shall be disposed of by the Contractor only after they have been inventoried and a written release has been signed by the PM.

The following material shall be removed from service and turned over to the PM or City of Norman representative, at a site selected by the PM, in the same condition as when it was removed.

- All Honeywell IC panels
- All card readers
- All RFE motion sensors
- All magnetic locks
- All power supplies removed
- All electric strikes

All of the existing wiring that is removed from the two locations will be collected and stored at the Fleet facility in containers.

CERTIFICATES AND INSPECTIONS

Obtain and pay for all required State installation inspections, in accordance with State and local codes. Deliver originals of these certificates to the Project Representative.

OPERATION AND MAINTENANCE DATA
All operations and maintenance data shall comply with the submission and content requirements specified.

Supply the following additional documentation:

1. Manufacturer’s wiring diagrams for electrically powered equipment.

RECORD DRAWINGS

The Contractor shall maintain at least one copy each of the specifications and drawings on the job site at all times.

The daily record of changes shall be the responsibility of Contractor's field superintendent. No arbitrary mark-ups will be permitted.

At completion of the project, the Contractor shall submit the marked-up record drawings to the PM prior to final payment.

PART 2 - PRODUCTS

ACCESS PANELS AND DOORS

Coordinate the location of all access panels if needed. Where special products are required to provide access, the products should be approved prior to the installation.

SEALING AND FIRE STOPPING

FIRE AND/OR SMOKE RATED PENETRATIONS:
Provide all fire stopping of fire rated penetrations and sealing of smoke rated penetrations in compliance with all NFPA guide lines and local or state codes.

Whenever possible, avoid penetrations of fire and smoke rated construction. When they cannot be avoided, verify that the design provides sufficient space for the penetration to be effectively fire and smoke stopped.

NON-RATED PENETRATIONS:

Conduit and Cable Tray Penetrations:
At conduit and cable tray penetrations of non-rated interior partitions, floors and exterior walls above grade, use urethane caulk in annular space between conduit and sleeve, or the core drilled opening.

PART 3 - EXECUTION

EXCAVATION AND BACKFILL

Perform all excavation and backfill work to accomplish indicated systems installation in accordance with section 278201 – UNDERGROUND DUCTS AND MAINTENANCE HOLES FOR COMMUNICATIONS SYSTEMS.

CONCRETE WORK

Coordinate the quantity and location of all cast-in-place concrete work with the PM.

CUTTING AND PATCHING

Refer to Division 27, General Requirements, Cutting and Patching.

BUILDING ACCESS

Arrange for the necessary openings in the building to allow for admittance of all apparatus. When the building access was not previously arranged and must be provided by this contractor, restore any opening to its original condition after the apparatus has been brought into the building.

EQUIPMENT ACCESS

Install all piping, conduit, ductwork, and accessories to permit access to equipment for maintenance. Coordinate the exact location of wall and ceiling access panels and doors with the PM, making sure that access is available for all equipment and specialties. Where access is required in plaster or drywall walls or ceilings, furnish the access doors to the General Contractor and reimburse the General Contractor for installation of those access doors.

COORDINATION

The Contractor shall cooperate with other trades and PM in locating work in a proper manner. Should it be necessary to raise or lower or move longitudinally any part of the new infrastructure work to better fit the general installation, such work shall be done at no extra cost to the contract, provided such decision is reached prior to actual installation. The Contractor shall check location of electrical outlets with respect to other installations before installing.

The Contractor shall verify that all devices are compatible for the surfaces on which they will be used. This includes, but is not limited to panel boards, devices, etc.

Coordinate all work with other contractors prior to installation. Any installed work that is not coordinated and that interferes with other contractor's work shall be removed or relocated at the installing contractor's expense.

Verify the integrity of any fire or smoke rating on these surfaces.

SEALING AND FIRE STOPPING
FIRE AND/OR SMOKE RATED PENETRATIONS:
Provide all fire stopping of fire rated penetrations and sealing of smoke rated penetrations in compliance with NFPA, all local codes for Fire Stopping.

NON-RATED PENETRATIONS:

At all interior walls and exterior walls, conduit penetrations are required to be sealed. Apply sealant to both sides of the penetration in such a manner that the annular space between the sleeve or cored opening and the conduit is completely blocked.

PENETRATIONS SUBJECT TO WATER INTRUSION:
For penetrations (both rated and non-rated) in floors subject to water intrusion or in rooms housing electrical equipment (but not within walls) provide one of the following:

- Conduit penetration where steel pipe sleeve is used extend steel sleeve 2" above the floor.
- Conduit penetration where cast in place fire stopping device/sleeve is used, extend device/sleeve 2" above the floor (provided it meets the device's UL listing).
- Conduit penetration where there is no steel sleeve or cast in place fire stopping device/sleeve, provide 2"x 2" x 1/8" galvanized steel angles fastened to floor surrounding the penetration or group of penetrations to prevent water from getting to penetration. Provide urethane caulk between angles and floor and fasten angles to floor minimum 8"on center. Seal corners water tight with urethane caulk.

Floors subject to water intrusion or rooms housing electrical equipment include the following locations:

- Data/Telecommunications Rooms
- Electrical Equipment Rooms

Provide waterproof caulk sealant top coating on fire stopping system (or other approved means to protect the fire stopping system from water) in areas subject to wash down.

HOUSEKEEPING AND CLEAN UP
The Contractor shall clean up and remove from the premises, on a daily basis, all debris and rubbish resulting from its work and shall repair all damage to new and existing equipment resulting from its work. When job is complete, this Contractor shall remove all tools, excess material and equipment, etc., from the site.

AGENCY TRAINING
All training provided for agency shall comply with the format, general content requirements and submission guidelines.

Contractor to provide factory authorized representative knowledgeable with the operations, maintenance and troubleshooting of the system and/or components defined within this section for a minimum period of 40 hours.

END OF SECTION

DIVISION 27 - COMMUNICATIONS

270500 - COMMON WORK RESULTS FOR COMMUNICATIONS

PART 4 - GENERAL

4.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, apply to this Section.

4.2 SUMMARY

A. Section Includes:

1. Communications equipment coordination and installation.
2. Sleeves for pathways and cables.
3. Sleeve seals.
4. Grout.
5. Common communications installation requirements.

4.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

4.4 SUBMITTALS

A. Product Data: For sleeve seals.

4.5 COORDINATION

A. Coordinate arrangement, mounting, and support of communications equipment:

1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
3. To allow right of way for piping and conduit installed at required slope.
4. So connecting pathways, cables, wire ways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

C. Coordinate location of access panels and doors for communications items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."

D. Coordinate sleeve selection and application with selection and application of fire stopping specified for each "Penetration Fire stopping."280544 – SLEEVES AND SLEEVE SEALS FOR ELECTRONIC SAFETY AND SECURITY.”

PART 5 - PRODUCTS

5.1 SLEEVES FOR PATHWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Sleeves for Rectangular Openings: Galvanized sheet steel.

1. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

5.2 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and pathway or cable.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Metraflex Co.
d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of pathway or cable.
3. Pressure Plates: Carbon steel. Include two for each sealing element.
4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

5.3 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, non-staining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 6 - EXECUTION

6.1 COMMON REQUIREMENTS FOR COMMUNICATIONS INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both communications equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right of Way: Give to piping systems installed at a required slope.

6.2 SLEEVE INSTALLATION FOR COMMUNICATIONS PENETRATIONS

A. Communications penetrations occur when pathways, cables, wire ways, or cable trays penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with fire stop system used are fabricated during construction of floor or wall.

E. Cut sleeves to length for mounting flush with both surfaces of walls.

F. Extend sleeves installed in floors 3 inches above finished floor level.

G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and pathway or cable, unless indicated otherwise.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and pathway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants.".

J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pathway and cable penetrations. Install sleeves and seal pathway and cable penetration sleeves with fire stop materials. Comply with requirements in Division 07 Section "Penetration Fire stopping."

K. Roof-Penetration Sleeves: Seal penetration of individual pathways and cables with flexible boot-type flashing units applied in coordination with roofing work.

L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between pathway or cable and sleeve for installing mechanical sleeve seals.

6.3 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for pathway or cable material and size. Position pathway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pathway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

6.4 FIRESTOPPING

A. Apply fire stopping to penetrations of fire-rated floor and wall assemblies for communications installations to restore original fire-resistance rating of assembly. Fire stopping materials and installation requirements are specified in Division 07 Section "Penetration Fire stopping."

END OF SECTION 270500

SECTION 278201 - UNDERGROUND DUCTS AND MAINTENANCE/HAND HOLES FOR COMMUNICATION SYSTEMS

PART 7 - GENERAL

7.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Related Sections:

1. Division 27 Section Common Work Results for Communications Systems”
2. Division 28 Section "280544 – Sleeves and Sleeve Seals for Electronic Safety and Security"

7.2 SUMMARY

A. This Section includes the following:

1. Conduit, ducts, and duct accessories for direct-buried duct banks.
2. Hand holes and boxes.
3. Maintenance holes.

7.3 DEFINITION

A. RNC: Rigid nonmetallic conduit.

7.4 SUBMITTALS

A. Product Data: For the following:

1. Duct-bank materials, including separators and miscellaneous components.
2. Ducts and conduits and their accessories, including elbows, end bells, bends, fittings, and solvent cement.
3. Accessories for maintenance holes, hand holes, boxes.
4. Warning tape.
5. Warning planks.

B. Shop Drawings for Precast or Factory-Fabricated Underground Utility Structures: Include plans, elevations, sections, details, attachments to other work, and accessories, including the following:

1. Duct entry provisions, including locations and duct sizes.

2. Reinforcement details.
3. Frame and cover design and maintenance hole frame support rings.
4. Ladder details.
5. Grounding details.
6. Dimensioned locations of cable rack inserts, pulling-in and lifting irons, and sumps.
7. Joint details.

C. Shop Drawings for Factory-Fabricated Hand holes and Boxes Other Than Precast Concrete: Include dimensioned plans, sections, and elevations, and fabrication and installation details, including the following:

1. Duct entry provisions, including locations and duct sizes.
2. Cover design.
3. Grounding details.
4. Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.

D. Duct-Bank Coordination Drawings: Show duct profiles and coordination with other utilities and underground structures.

1. Include plans and sections, drawn to scale, and show bends and locations of expansion fittings.
2. Drawings shall be signed and sealed by a qualified professional engineer or RCDD/OSP.

E. Product Certificates: For concrete and steel used in precast concrete maintenance holes and hand holes, as required by ASTM C 858.

F. Qualification Data: For professional engineer and testing agency.

G. Source quality-control test reports.

H. Field quality-control test reports.

7.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

B. Comply with ANSI C2.

C. Comply with NFPA 70.

7.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver ducts to Project site with ends capped. Store nonmetallic ducts with supports to prevent bending, warping, and deforming.

B. Store precast concrete underground utility structures at Project site as recommended by manufacturer to prevent physical damage. Arrange so identification markings are visible.

C. Lift and support precast concrete units only at designated lifting or supporting points.

7.7 PROJECT CONDITIONS

A. Interruption of Existing Communication Service: Do not interrupt communication service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary communication service according to requirements indicated:

1. Notify Construction Manager no fewer than two days in advance of proposed interruption of communication service.
2. Do not proceed with interruption of communication service without Construction Manager's written permission.

7.8 COORDINATION

A. Coordinate layout and installation of ducts, maintenance holes, hand holes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in the field.

B. Coordinate elevations of ducts and duct-bank entrances into maintenance holes, hand holes, and boxes with final locations and profiles of ducts and duct banks as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations from those indicated as required to suit field conditions and to ensure that duct runs drain to maintenance holes and handholes, and as approved by Architect.

7.9 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

B. Furnish cable-support stanchions, arms, and associated fasteners in quantities equal to 5 percent of quantity of each item installed.

PART 8 - PRODUCTS

8.1 CONDUIT

A. Rigid Steel Conduit: Galvanized. Comply with ANSI C80.1.

B. RNC: NEMA TC 2, Type EPC-40-PVC, UL 651, with matching fittings by same manufacturer as the conduit, complying with NEMA TC 3 and UL 514B.

8.2 NONMETALLIC DUCTS AND DUCT ACCESSORIES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

C. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:

1. ARNCO Corp.
2. Beck Manufacturing.
3. Cantex, Inc.
4. CertainTeed Corp.; Pipe & Plastics Group.
5. Condux International, Inc.
6. ElecSys, Inc.
7. Electri-Flex Company.
8. IPEX Inc.
9. Lamson & Sessions; Carlon Electrical Products.
10. Manhattan/CDT; a division of Cable Design Technologies.
11. Spiraduct/AFC Cable Systems, Inc.

D. Underground Plastic Utilities Duct: NEMA TC 6 & 8, Schedule 40-PVC, ASTM F 512, with matching fittings by the same manufacturer as the duct, complying with NEMA TC 9.

E. Duct Accessories:

1. Duct Separators: Factory-fabricated rigid PVC interlocking spacers, sized for type and sizes of ducts with which used, and selected to provide minimum duct spacing indicated while supporting ducts during concreting or backfilling.
2. Warning Tape: Underground-line warning tape specified in Division 26 Section "Identification for Communications Systems."

8.3 PRECAST MAINTENANCE HOLES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Carder Concrete Products.
2. Christy Concrete Products.
3. Elmhurst-Chicago Stone Co.
4. Oldcastle Precast Group.
5. Riverton Concrete Products; a division of Cretex Companies, Inc.
6. Utility Concrete Products, LLC.
7. Utility Vault Co.
8. Wausau Tile, Inc.

C. Comply with ASTM C 858, with structural design loading as specified in Part 3 "Underground Enclosure Application" Article and with interlocking mating sections, complete with accessories, hardware, and features.

1. Windows: Precast openings in walls, arranged to match dimensions and elevations of approaching ducts and duct banks plus an additional 12 inches (300 mm) vertically and horizontally to accommodate alignment variations.

a. Windows shall be located no less than 6 inches (150 mm) from interior surfaces of walls, floors, or roofs of maintenance holes, but close enough to corners to facilitate racking of cables on walls.
b. Window opening shall have cast-in-place, welded wire fabric reinforcement for field cutting and bending to tie in to concrete envelopes of duct banks.
c. Window openings shall be framed with at least two additional No. 4 steel reinforcing bars in concrete around each opening.

2. Duct Entrances in Maintenance hole Walls: Cast end-bell or duct-terminating fitting in wall for each entering duct.

a. Type and size shall match fittings to duct or conduit to be terminated.
b. Fittings shall align with elevations of approaching ducts and be located near interior corners of maintenance holes to facilitate racking of cable.

D. Concrete Knockout Panels: 1-1/2 to 2 inches (38 to 50 mm) thick, for future conduit entrance and sleeve for ground rod.

E. Joint Sealant: Asphaltic-butyl material with adhesion, cohesion, flexibility, and durability properties necessary to withstand maximum hydrostatic pressures at the installation location with the ground-water level at grade.

8.4 UTILITY STRUCTURE ACCESSORIES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Bilco Company (The).
2. Campbell Foundry Company.
3. Carder Concrete Products.
4. Christy Concrete Products.
5. East Jordan Iron Works, Inc.
6. Elmhurst-Chicago Stone Co.
7. McKinley Iron Works, Inc.
8. Neenah Foundry Company.
9. NewBasis.
10. Oldcastle Precast Group.
11. Osburn Associates, Inc.
12. Pennsylvania Insert Corporation.
13. Riverton Concrete Products; a division of Cretex Companies, Inc.
14. Strongwell Corporation; Lenoir City Division.
15. Underground Devices, Inc.
16. Utility Concrete Products, LLC.
17. Utility Vault Co.
18. Wausau Tile, Inc.

C. Maintenance hole Frames, Covers, and Chimney Components: Comply with structural design loading specified for maintenance hole.

1. Frame and Cover: Weatherproof, gray cast iron complying with ASTM A 48/A 48M, Class 30B with milled cover-to-frame bearing surfaces; diameter, 29 inches (737 mm).

   a. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
   b. Special Covers: Recess in face of cover designed to accept finish material in paved areas.

2. Cover Legend: Cast in. Selected to suit system.

   a. Legend: "COMMUNICATION" for communications, telephone duct systems.

3. Maintenance hole Chimney Components: Precast concrete rings with dimensions matched to those of roof opening.

   a. Mortar for Chimney Ring and Frame and Cover Joints: Comply with ASTM C 270, Type M, except for quantities less than 2.0 cu. ft. (60 L) where packaged mix complying with ASTM C 387, Type M, may be used.

D. Maintenance hole Sump Frame and Grate: ASTM A 48/A 48M, Class 30B, gray cast iron.

E. Maintenance hole Sump Pump: Submersible type, Stainless steel motor housing and fasteners, Cast iron pump housing, Mechanical float switch, fit in sump basins 11" in diameter or larger,

oil-filled 3/4 HP motor thermally protected, Glass reinforced poly-carbonate impeller, Top suction strainer filter for debris, 1-1/2" NPT discharge, 3450 GPM

F. Pulling Eyes in Concrete Walls: Eyebolt with reinforcing-bar fastening insert, 2-inch- (50-mm) diameter eye, and 1-by-4-inch (25-by-100-mm) bolt.

1. Working Load Embedded in 6-Inch (150-mm), 4000-psi (27.6-MPa) Concrete: 13,000-lbf (58-kN) minimum tension.

G. Bolting Inserts for Concrete Utility Structure Cable Racks and Other Attachments: Flared, threaded inserts of noncorrosive, chemical-resistant, nonconductive thermoplastic material; 1/2-inch (13-mm) ID by 2-3/4 inches (69 mm) deep, flared to 1-1/4 inches (32 mm) minimum at base.

1. Tested Ultimate Pullout Strength: 12,000 lbf (53 kN) minimum.

H. Expansion Anchors for Installation after Concrete Is Cast: Zinc-plated, carbon-steel-wedge type with stainless-steel expander clip with 1/2-inch (13-mm) bolt, 5300-lbf (24-kN) rated pullout strength, and minimum 6800-lbf (30-kN) rated shear strength.

I. Cable Rack Assembly: Steel, hot-dip galvanized, except insulators.

1. Stanchions: T-section or channel; 2-1/4-inch (57-mm) nominal size; punched with 14 holes on 1-1/2-inch (38-mm) centers for cable-arm attachment.
2. Arms: 1-1/2 inches (38 mm) wide, lengths ranging from 3 inches (75 mm) with 450-lb (204-kg) minimum capacity to 18 inches (460 mm) with 250-lb (114-kg) minimum capacity. Arms shall have slots along full length for cable ties and be arranged for secure mounting in horizontal position at any vertical location on stanchions.
3. Insulators: High-glaze, wet-process porcelain arranged for mounting on cable arms.

J. Fixed Maintenance hole Ladders: Arranged for attachment to roof or wall and floor of maintenance hole. Ladder and mounting brackets and braces shall be fabricated from hot-dip galvanized steel.

K. Duct-Water Plug: air, and gas tight seal. Split design allows installation around continuous cable or innerduct, chemical resistant, injection molded gasket material. Gasket provides soft buffer to protect cable sheath. Withstand vibrations of heavily loaded trucks or seismic movements, Sealing capacity to minimum 22 psi (50' head of hydrostatic pressure). Stainless Steel nuts, bolts, washers, and fasteners.

L. Cover Hooks: Heavy duty, designed for lifts 60 lbf (270 N) and greater. One required.

8.5 SOURCE QUALITY CONTROL

A. Test and inspect precast concrete utility structures according to ASTM C 1037.

B. Nonconcrete Handhole and Pull-Box Prototype Test: Test prototypes of maintenance holes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.

1. Tests of materials shall be performed by an independent testing agency.
2. Strength tests of complete boxes and covers shall be by either an independent testing agency or the manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.
3. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012, and traceable to NIST standards.

PART 9 - EXECUTION

9.1 UNDERGROUND DUCT APPLICATION

A. Underground Ducts for Telephone, Communications, or Data Utility Service Cables: RNC, NEMA Type EPC-40-PVC, installed in direct-buried duct bank, unless otherwise indicated.

B. Underground Ducts Crossing Driveways, Roadways and Railroads: RNC, NEMA Type EPC-40-PVC, encased in reinforced concrete.

9.2 UNDERGROUND ENCLOSURE APPLICATION

A. Maintenance holes: Precast concrete.

1. Units Located in Roadways and Other Deliberate Traffic Paths by Heavy or Medium Vehicles: H-20 structural load rating according to AASHTO HB 17.
2. Units Not Located in Deliberate Traffic Paths by Heavy or Medium Vehicles: H-10 load rating according to AASHTO HB 17.

9.3 EARTHWORK

A. Excavation and Backfill: Comply with Division 31 Section "Earth Moving," but do not use heavy-duty, hydraulic-operated, compaction equipment.

B. Restore surface features at areas disturbed by excavation and reestablish original grades, unless otherwise indicated. Replace removed sod immediately after backfilling is completed.

C. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary topsoiling, fertilizing, liming, seeding, sodding, sprigging, and mulching. Comply with Division 32 Sections "Turf and Grasses" and "Plants."

D. Cut and patch existing pavement in the path of underground ducts and utility structures according to Division 01 Section "Cutting and Patching."

9.4 DUCT INSTALLATION

A. Slope: Pitch ducts a minimum slope of 1:300 down toward maintenance holes and handholes and away from buildings and equipment. Slope ducts from a high point in runs between two maintenance holes to drain in both directions.

B. Curves and Bends: Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with a minimum radius of 48 inches (1220 mm), both horizontally and vertically, at other locations, unless otherwise indicated.

C. Joints: Use solvent-cemented joints in ducts and fittings and make watertight according to manufacturer's written instructions. Stagger couplings so those of adjacent ducts do not lie in same plane.

D. Duct Entrances to Maintenance holes and Concrete and Polymer Concrete Handholes: Use end bells, spaced approximately 10 inches (250 mm) o.c. for 5-inch (125-mm) ducts, and vary proportionately for other duct sizes.

1. Begin change from regular spacing to end-bell spacing 10 feet (3 m) from the end bell without reducing duct line slope and without forming a trap in the line.

2. Direct-Buried Duct Banks: Install an expansion and deflection fitting in each conduit in the area of disturbed earth adjacent to maintenance hole or handhole.
3. Grout end bells into structure walls from both sides to provide watertight entrances.

E. Building Wall Penetrations: Make a transition from underground duct to rigid steel conduit at least 5 feet (1.5 m) outside the building wall without reducing duct line slope away from the building, and without forming a trap in the line. Use fittings manufactured for duct-to-conduit transition. Install conduit penetrations of building walls as specified in Division 26 Section "Common Work Results for Electrical."

F. Sealing: Provide temporary closure at terminations of ducts that have cables pulled. Seal spare ducts at terminations. Use sealing compound and plugs to withstand at least 15-psig (1.03-MPa) hydrostatic pressure.

G. Pulling Cord: Install 100-lbf- (445-N-) test nylon cord in ducts, including spares.

H. Concrete-Encased Ducts: Support ducts on duct separators.

1. Separator Installation: Space separators close enough to prevent sagging and deforming of ducts, with not less than 4 spacers per 20 feet (6 m) of duct. Secure separators to earth and to ducts to prevent floating during concreting. Stagger separators approximately 6 inches (150 mm) between tiers. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.
2. Concreting Sequence: Pour each run of envelope between maintenance holes or other terminations in one continuous operation.

    a. Start at one end and finish at the other, allowing for expansion and contraction of ducts as their temperature changes during and after the pour. Use expansion fittings installed according to manufacturer's written recommendations, or use other specific measures to prevent expansion-contraction damage.
    b. If more than one pour is necessary, terminate each pour in a vertical plane and install 3/4-inch (19-mm) reinforcing rod dowels extending 18 inches (450 mm) into concrete on both sides of joint near corners of envelope.

3. Pouring Concrete: Spade concrete carefully during pours to prevent voids under and between conduits and at exterior surface of envelope. Do not allow a heavy mass of concrete to fall directly onto ducts. Use a plank to direct concrete down sides of bank assembly to trench bottom. Allow concrete to flow to center of bank and rise up in middle, uniformly filling all open spaces. Do not use power-driven agitating equipment unless specifically designed for duct-bank application.
4. Reinforcement: Reinforce concrete-encased duct banks where they cross disturbed earth and where indicated. Arrange reinforcing rods and ties without forming conductive or magnetic loops around ducts or duct groups.
5. Forms: Use walls of trench to form side walls of duct bank where soil is self-supporting and concrete envelope can be poured without soil inclusions; otherwise, use forms.
6. Minimum Space between Ducts: 3 inches (75 mm) between ducts and exterior envelope wall, 2 inches (50 mm) between ducts for like services, and 4 inches (100 mm) between power and signal ducts.
7. Depth: Install top of duct bank at least 24 inches (600 mm) below finished grade in areas not subject to deliberate traffic, and at least 30 inches (750 mm) below finished grade in deliberate traffic paths for vehicles, unless otherwise indicated.
8. Stub-Ups: Use manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Extend concrete encasement throughout the length of the elbow.

9. Stub-Ups: Use manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.

    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete.
    b. Stub-Ups to Equipment: For equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of base. Install insulated grounding bushings on terminations at equipment.

10. Warning Tape: Bury warning tape approximately 12 inches (300 mm) above all concrete-encased ducts and duct banks. Align tape parallel to and within 3 inches (75 mm) of the centerline of duct bank. Provide an additional warning tape for each 12-inch (300-mm) increment of duct-bank width over a nominal 18 inches (450 mm). Space additional tapes 12 inches (300 mm) apart, horizontally.

I. Direct-Buried Duct Banks:

1. Support ducts on duct separators coordinated with duct size, duct spacing, and outdoor temperature.
2. Space separators close enough to prevent sagging and deforming of ducts, with not less than 4 spacers per 20 feet (6 m) of duct. Secure separators to earth and to ducts to prevent displacement during backfill and yet permit linear duct movement due to expansion and contraction as temperature changes. Stagger spacers approximately 6 inches (150 mm) between tiers.
3. Excavate trench bottom to provide firm and uniform support for duct bank. Prepare trench bottoms as specified in Division 31 Section "Earth Moving" for pipes less than 6 inches (150 mm) in nominal diameter.
4. Install backfill as specified in Division 31 Section "Earth Moving."
5. After installing first tier of ducts, backfill and compact. Start at tie-in point and work toward end of duct run, leaving ducts at end of run free to move with expansion and contraction as temperature changes during this process. Repeat procedure after placing each tier. After placing last tier, hand-place backfill to 4 inches (100 mm) over ducts and hand tamp. Firmly tamp backfill around ducts to provide maximum supporting strength. Use hand tamper only. After placing controlled backfill over final tier, make final duct connections at end of run and complete backfilling with normal compaction as specified in Division 31 Section "Earth Moving."
6. Install ducts with a minimum of 3 inches (75 mm) between ducts for like services and 6 inches (150 mm) between power and signal ducts.
7. Depth: Install top of duct bank at least 36 inches (900 mm) below finished grade, unless otherwise indicated.
8. Set elevation of bottom of duct bank below the frost line.
9. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.
10. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.

    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete.
    b. For equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

9.5 INSTALLATION OF CONCRETE MAINTENANCE HOLES, HANDHOLES, AND BOXES

A. Precast Concrete Handhole and Maintenance hole Installation:

1. Comply with ASTM C 891, unless otherwise indicated.
2. Install units level and plumb and with orientation and depth coordinated with connecting ducts to minimize bends and deflections required for proper entrances.
3. Unless otherwise indicated, support units on a 6" (150 mm) level bed of crushed stone or gravel, graded from 1-inch (25-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.

B. Elevations:

1. Maintenance hole Roof: Install with rooftop at least 15 inches (380 mm) below finished grade.
2. Maintenance hole Frame: In paved areas and trafficways, set frames flush with finished grade. Set other maintenance hole frames 1 inch (25 mm) above finished grade.
3. Install handholes with bottom below the frost line, 30" (750 mm) below grade.
4. Handhole Covers: In paved areas and trafficways, set surface flush with finished grade. Set covers of other handholes 1 inch (25 mm) above finished grade.
5. Where indicated, cast handhole cover frame integrally with handhole structure.

C. Drainage: Install drains in bottom of maintenance holes where indicated. Coordinate with drainage provisions indicated.

D. Maintenance hole Access: Circular opening in maintenance hole roof; sized to match cover size.

1. Maintenance holes with Fixed Ladders: Offset access opening from maintenance hole centerlines to align with ladder.
2. Install chimney, constructed of precast concrete collars and rings to support frame and cover and to connect cover with maintenance hole roof opening. Provide moisture-tight masonry joints and waterproof grouting for cast-iron frame to chimney.

E. Waterproofing: Apply waterproofing to exterior surfaces of maintenance holes after concrete has cured at least three days. Waterproofing materials and installation are specified in Division 07 Section " Thermoplastic Sheet Waterproofing." After ducts have been connected and grouted, and before backfilling, waterproof joints and connections and touch up abrasions and scars. Waterproof exterior of maintenance hole chimneys after mortar has cured at least three days.

F. Dampproofing: Apply dampproofing to exterior surfaces of maintenance holes after concrete has cured at least three days. Dampproofing materials and installation are specified in Division 07 Section "Bituminous Dampproofing." After ducts have been connected and grouted, and before backfilling, dampproof joints and connections and touch up abrasions and scars. Dampproof exterior of maintenance hole chimneys after mortar has cured at least three days.

G. Hardware: Install removable hardware, including pulling eyes, cable stanchions, and cable arms, as required for installation and support of cables and conductors and as indicated.

H. Fixed Maintenance Hole Ladders: Arrange to provide for safe entry with maximum clearance from cables and other items in maintenance holes.

I. Field-Installed Bolting Anchors in Maintenance holes and Concrete Handholes: Do not drill deeper than 3-7/8 inches (98 mm) for maintenance holes and 2 inches (50 mm) for handholes, for anchor bolts installed in the field. Use a minimum of two anchors for each cable stanchion.

J. Warning Sign: Install "Confined Space Hazard" warning sign on the inside surface of each maintenance hole cover.

9.6 INSTALLATION OF HANDHOLES AND BOXES OTHER THAN PRECAST CONCRETE

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting ducts to minimize bends and deflections required for proper entrances. Use box extension if required to match depths of ducts, and seal joint between box and extension as recommended by the manufacturer.

B. Unless otherwise indicated, support units on a 6" (150 mm) level bed of crushed stone or gravel, graded from 1/2-inch (12.7-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas and trafficways, set so cover surface will be flush with finished grade. Set covers of other handholes 1 inch (25 mm) above finished grade.

D. Install handholes and boxes with bottom below the frost line, 30" (750 mm) below grade.

E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in the enclosure.

F. Field-cut openings for ducts and conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

G. For enclosures installed in asphalt paving and concrete and subject to occasional, nondeliberate, heavy-vehicle loading, form and pour a concrete ring encircling, and in contact with, enclosure and with top surface screened to top of box cover frame. Bottom of ring shall rest on compacted earth.

1. Concrete: 3000 psi (20 kPa), 28-day strength, complying with Division 03 Section "Cast-in-Place Concrete," with a troweled finish.

9.7 GROUNDING

A. Ground underground ducts and utility structures according to Division 26 Section "Grounding and Bonding for Electrical Systems."

9.8 FIELD QUALITY CONTROL

A. Perform the following tests and inspections and prepare test reports:

1. Demonstrate capability and compliance with requirements on completion of installation of underground ducts and utility structures.
2. Pull aluminum or wood test mandrel through duct to prove joint integrity and test for out-of-round duct. Provide mandrel equal to 80 percent fill of duct. If obstructions are indicated, remove obstructions and retest.
3. Test maintenance hole and handhole grounding to ensure electrical continuity of grounding and bonding connections. Measure and report ground resistance as specified in Division 26 Section "Grounding and Bonding for Electrical Systems."

B. Correct deficiencies and retest as specified above to demonstrate compliance.

9.9 CLEANING

A. Pull leather-washer-type duct cleaner, with graduated washer sizes, through full length of ducts. Follow with rubber duct swab for final cleaning and to assist in spreading lubricant throughout ducts.

B. Clean internal surfaces of maintenance holes, including sump. Remove foreign material.

END OF SECTION 278201

DIVISION 280000 – ELECTRONIC SAFETY AND SECURITY

SECTION 280513 - CONDUCTORS AND CABLES FOR ELECTRONIC SAFETY AND SECURITY

PART 10 - GENERAL

10.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

10.2 SUMMARY

A. Section Includes:

1. UTP cabling.
2. 62.5 -micrometer, multimode optical fiber cabling. Match existing
3. Coaxial cabling.
4. RS-232 cabling.
5. RS-485 cabling.
6. Low-voltage cabling.
7. Control-circuit conductors.
8. Identification products.

10.3 DEFINITIONS

A. BICSI: Building Industry Consulting Service International.

B. EMI: Electromagnetic interference.

C. IDC: Insulation displacement connector.

D. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control and signaling power-limited circuits.

E. Open Cabling: Passing telecommunications cabling through open space (e.g., between the studs of a wall cavity).

F. RCDD: Registered Communications Distribution Designer.

10.4 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Pathways shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

10.5 SUBMITTALS

A. Product Data: For each type of product indicated.

1. For coaxial cable, include the following installation data for each type used:

    a. Nominal OD.
    b. Minimum bending radius.
    c. Maximum pulling tension.

B. Shop Drawings: Cable tray layout, showing cable tray route to scale, with relationship between the tray and adjacent structural, electrical, and mechanical elements. Include the following:

1. Vertical and horizontal offsets and transitions.
2. Clearances for access above and to side of cable trays.
3. Vertical elevation of cable trays above the floor or bottom of ceiling structure.

C. Qualification Data: For qualified layout technician, installation supervisor, and field inspector.

D. Seismic Qualification Certificates: For pathways, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

E. Source quality-control reports.

F. Field quality-control reports.

G. Operation and Maintenance Data: For wire and cable to include in operation and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Allowable pulling tension of cable.
2. Cable connectors and terminations recommended by the manufacturer.

10.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: An NRTL.

1. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.

B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 50 or less.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

10.7 PROJECT CONDITIONS

A. Do not install conductors and cables that are wet, moisture damaged, or mold damaged.

1. Indications that wire and cables are wet or moisture damaged include, but are not limited to, discoloration and sagging of factory packing materials.

B. Environmental Limitations: Do not deliver or install UTP, optical fiber, and coaxial cables and connecting materials until wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 11 - PRODUCTS

11.1 PATHWAYS

A. Support of Open Cabling: NRTL labeled for support of Category 6 cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.

1. Support brackets with cable tie slots for fastening cable ties to brackets.
2. Lacing bars, spools, J-hooks, and D-rings.
3. Straps and other devices.

B. Cable Trays:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Allied Tube & Conduit; a business unit of Tyco Electrical & Metal Products.
b. Cablofil.
c. Cooper B-Line, Inc.
d. GS Metals Corp.
e. Snaketray; Cable Management Solutions, Inc.

2. Cable Tray Materials: Metal, suitable for indoors, and protected against corrosion by electroplated zinc galvanizing, complying with ASTM B 633, Type 1, not less than 0.000472 inch (0.012 mm) thick.

a. Basket Cable Trays: 12 to 18 inches (305 mm) wide and 4 inches (50 mm) deep. Wire mesh spacing shall not exceed 2 by 4 inches (50 by 100 mm).
b. Ladder Cable Trays: Nominally 12 inches (305 mm) wide, and a rung spacing of 6 inches (150 mm).
c.

C. Conduit and Boxes: Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems." Flexible metal conduit shall not be used.

D. Outlet boxes shall be no smaller than 2 inches (50 mm) wide, 3 inches (75 mm) high, and 2-1/2 inches (64 mm) deep.

11.2 BACKBOARDS

A. Backboards: A/C Grade Plywood, fire-retardant treated, 3/4 by 48 by 96 inches (19 by 1220 by 2440 mm). Comply with requirements for plywood backing panels in Division 06 Section "Rough Carpentry".

11.3 UTP CABLE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. ADC.
2. Berk-Tek; a Nexans company.
3. CommScope, Inc.
4. Draka Cableteq USA.
5. Superior Essex Inc.
6. SYSTIMAX Solutions; a CommScope, Inc. brand.

B. Description: 100-ohm, 4-pair UTP, covered with a blue thermoplastic jacket.

1. Comply with ICEA S-90-661 for mechanical properties.
2. Comply with TIA/EIA-568-B.1 for performance specifications.
3. Comply with TIA/EIA-568-B.2, Category 6.
4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:

    a. Communications, Plenum Rated: Type CMP, complying with NFPA 262.
    b. Multipurpose, Plenum Rated: Type MPP, complying with NFPA 262.

11.4 UTP CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. ADC.
2. Hubbell Incorporated; Hubbell Premise Wiring.
3. Leviton Voice & Data Division.
4. Molex Premise Networks; a division of Molex, Inc.
5. PANDUIT CORP.
6. Siemon.

B. UTP Cable Connecting Hardware: IDC type, using modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of the same category or higher.

C. Connecting Blocks: 110-style for Category 6. Provide blocks for the number of cables terminated on the block, plus 25 percent spare. Integral with connector bodies, including plugs and jacks where indicated.

11.5 OPTICAL FIBER CABLE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Berk-Tek; a Nexans company.
   2. CommScope, Inc.
   3. Corning Incorporated; Corning Cable Systems.
   4. General Cable Technologies Corporation.
   5. Superior Essex Inc.
   6. SYSTIMAX Solutions; a CommScope, Inc. brand.

B. Description: Multimode, 62.5/125 -micrometer, 6-fiber, nonconductive, tight buffer, optical fiber cable.

   1. Comply with ICEA S-83-596 for mechanical properties.
   2. Comply with TIA/EIA-568-B.3 for performance specifications.
   3. Comply with TIA-492AAAB for detailed specifications.
   4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:
      a. Plenum Rated, Nonconductive: Type OFNP, complying with NFPA 262.

   5. Maximum Attenuation: 3.50 dB/km at 850 nm; 1.5 dB/km at 1300 nm.
   6. Minimum Modal Bandwidth: 1500 MHz-km at 850 nm; 500 MHz-km at 1300 nm.
   7. Minimum 10 Gig distance: 600 m at 850 nm; 600 m at 1300 nm

C. Jacket:

   1. Jacket Color: Orange for 62.5/125-micrometer cable.
   2. Cable cordage jacket, fiber, unit, and group color shall be according to TIA-598-C.
   3. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches (1000 mm).

11.6 OPTICAL FIBER CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   1. ADC.
   2. Berk-Tek; a Nexans company.
   3. Corning Incorporated; Corning Cable Systems.
   4. Hubbell Incorporated; Hubbell Premise Wiring.
   5. Molex Premise Networks; a division of Molex, Inc.
   6. Siemon.

B. Cable Connecting Hardware: Meet the Optical Fiber Connector Intermateability Standards (FOCIS) specifications of TIA-604-2-B, TIA-604-3-B, and TIA/EIA-604-12. Comply with TIA/EIA-568-B.3.

   1. Quick-connect, simplex and duplex, Type LC or SC connectors (match what the City of Norman is currently using). Insertion loss not more than 0.75 dB.
   2. Type SFF connectors may be used in termination racks, panels, and equipment packages.

11.7 RS-232 CABLE

A. Plenum-Rated Cable: NFPA 70, Type CMP.

1. Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors.
2. Plastic insulation.
3. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.
4. Plastic jacket.
5. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned copper drain wire.
6. Flame Resistance: Comply with NFPA 262.

11.8 RS-485 CABLE

A. Plenum-Rated Cable: NFPA 70, Type CMP.

1. Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors.
2. Fluorinated ethylene propylene insulation.
3. Unshielded.
4. Fluorinated ethylene propylene jacket.
5. Flame Resistance: NFPA 262, Flame Test.

11.9 LOW-VOLTAGE CONTROL CABLE

A. Plenum-Rated, Paired Cable: NFPA 70, Type CMP.

1. One pair, twisted, No. 18 AWG, stranded (19x30) tinned copper conductors.
2. Fluorinated ethylene propylene insulation.
3. Unshielded.
4. Fluorinated ethylene propylene jacket.
5. Flame Resistance: Comply with NFPA 262.

11.10 CONTROL-CIRCUIT CONDUCTORS

A. Class 1 Control Circuits: Stranded copper, Type THHN-THWN, complying with UL 83, in raceway.

B. Class 2 Control Circuits: Stranded copper, Type THHN-THWN, complying with UL 83, in raceway power-limited cable, complying with UL 83, concealed in building finishes.

C. Class 3 Remote-Control and Signal Circuits: Stranded copper, Type TW or TF, complying with UL 83.

11.11 IDENTIFICATION PRODUCTS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Brady Corporation.
2. HellermannTyton.
3. Kroy LLC.
4. PANDUIT CORP.

B. Comply with UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

C. Comply with requirements in Division 26 Section "Identification for Electrical Systems."

11.12 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate cables.

B. Factory test UTP and optical fiber cables on reels according to TIA/EIA-568-B.1.

C. Factory test UTP cables according to TIA/EIA-568-B.2.

D. Factory test multimode optical fiber cables according to TIA-526-14-A and TIA/EIA-568-B.3.

E. Factory sweep test coaxial cables at frequencies from 5 MHz to 1 GHz. Sweep test shall test the frequency response, or attenuation over frequency, of a cable by generating a voltage whose frequency is varied through the specified frequency range and graphing the results.

F. Cable will be considered defective if it does not pass tests and inspections.

G. Prepare test and inspection reports.

PART 12 - EXECUTION

12.1 INSTALLATION OF PATHWAYS

A. Cable Trays: Comply with NEMA VE 2 and TIA-569-B.

B. Comply with TIA-569-B for pull-box sizing and length of conduit and number of bends between pull points.

C. Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems." for installation of conduits and wireways.

D. Install manufactured conduit sweeps and long-radius elbows whenever possible.

E. Pathway Installation in Equipment Rooms:

1. Position conduit ends adjacent to a corner on backboard where a single piece of plywood is installed or in the corner of room where multiple sheets of plywood are installed around perimeter walls of room.
2. Install cable trays to route cables if conduits cannot be located in these positions.
3. Secure conduits to backboard when entering room from overhead.
4. Extend conduits 3 inches (75 mm) above finished floor.
5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

F. Backboards: Install backboards with 96-inch (2440-mm) dimension vertical. Butt adjacent sheets tightly, and form smooth gap-free corners and joints.

12.2 INSTALLATION OF HANGERS AND SUPPORTS

A. Comply with requirements in Division 26 Section "Hangers and Supports for Electrical Systems." for installation of supports for pathways, conductors and cables.

12.3 WIRING METHOD

A. Install wiring in metal raceways and wireways. Conceal raceway except in unfinished spaces and as indicated. Minimum conduit size shall be 3/4 inch (21 mm). Control and data transmission wiring shall not share conduit with other building wiring systems.

B. Install wiring in raceways except in accessible indoor ceiling spaces and in interior hollow gypsum board partitions where cable may be used. Conceal raceways and wiring except in unfinished spaces and as indicated. Minimum conduit size shall be 3/4 inch (21 mm). Control and data transmission wiring shall not share conduit with other building wiring systems.

C. Install cable, concealed in accessible ceilings, walls, and floors when possible.

D. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points. Use lacing bars and distribution spools. Separate power-limited and non-power-limited conductors as recommended in writing by manufacturer. Install conductors parallel with or at right angles to sides and back of enclosure. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with intrusion system to terminal blocks. Mark each terminal according to system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

12.4 INSTALLATION OF CONDUCTORS AND CABLES

A. Comply with NECA 1.

B. Conductors: Size according to system manufacturer's written instructions unless otherwise indicated.

C. General Requirements for Cabling:

1. Comply with TIA/EIA-568-B.1.
2. Comply with BICSI ITSIM, "Cable Termination Practices."
3. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.
4. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
5. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.
6. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
7. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
8. Pulling Cable: Comply with BICSI ITSIM, "Pulling Cable." Monitor cable pull tensions.

D. UTP Cable Installation: Install using techniques, practices, and methods that are consistent with Category 6 rating of components and that ensure Category 6 performance of completed and linked signal paths, end to end.

1. Comply with TIA/EIA-568-B.2.
2. Install 110-style IDC termination hardware unless otherwise indicated.
3. Do not untwist UTP cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.

E. Optical Fiber Cable Installation:

1. Comply with TIA/EIA-568-B.3.
2. Cable shall be terminated on connecting hardware that is rack or cabinet mounted.

F. Outdoor Coaxial Cable Installation:

1. Install outdoor connections in enclosures complying with NEMA 250, Type 4X. Install corrosion-resistant connectors with properly designed O-rings to keep out moisture.
2. Attach antenna lead-in cable to support structure at intervals not exceeding 36 inches (915 mm).

G. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend copper cable not in a wireway or pathway a minimum of 8 inches (200 mm) above ceilings by cable supports not more than 60 inches (1525 mm) apart.
3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

H. Installation of Cable Routed Exposed under Raised Floors:

1. Install plenum-rated cable only.
2. Install cabling after the flooring system has been installed in raised floor areas.
3. Coil cable 72 inches (1830 mm) long shall be neatly coiled not less than 12 inches (300 mm) in diameter below each feed point.

I. Separation from EMI Sources:

1. Comply with BICSI TDMM and TIA-569-B recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).
    b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches (300 mm).
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches (600 mm).

3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches (64 mm).

b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches (150 mm).
c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches (300 mm).

4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:

a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches (75 mm).
c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches (150 mm).

5. Separation between Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches (1200 mm).
6. Separation between Cables and Fluorescent Fixtures: A minimum of 5 inches (127 mm).

12.5 POWER AND CONTROL-CIRCUIT CONDUCTORS

A. 120-V Power Wiring: Install according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables" unless otherwise indicated.

B. Minimum Conductor Sizes:

1. Class 1 remote-control and signal circuits, No. 14 AWG.
2. Class 2 low-energy, remote-control and signal circuits, No. 16 AWG.
3. Class 3 low-energy, remote-control, alarm and signal circuits, No. 12 AWG.

12.6 CONNECTIONS

A. Comply with requirements in Division 28 Section "Conductors and Cables for electronic safety and security" for connecting, terminating, and identifying wires and cables.

12.7 FIRESTOPPING

A. Comply with TIA-569-B, "Firestopping" Annex A.

B. Comply with BICSI TDMM, "Firestopping Systems" Article.

12.8 GROUNDING

A. For communications wiring, comply with ANSI-J-STD-607-A and with BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.

B. For low-voltage wiring and cabling, comply with requirements in Division 26 Section "Grounding and Bonding for Electrical Systems."

12.9 IDENTIFICATION

A. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements for identification specified in Division 26 and Division 27.

12.10 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform tests and inspections.

C. Tests and Inspections:

1. Visually inspect UTP and optical fiber cable jacket materials for NRTL certification markings. Inspect cabling terminations to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with TIA/EIA-568-B.1.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Test UTP cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross connection.

    a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.

4. Optical Fiber Cable Tests:

    a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.1. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
    b. Link End-to-End Attenuation Tests:

        1) Multimode Link Measurements: Test at 850 or 1300 nm in 1 direction according to TIA-526-14-A, Method B, One Reference Jumper.
        2) Attenuation test results for links shall be less than 2.0 dB. Attenuation test results shall be less than that calculated according to equation in TIA/EIA-568-B.1.

D. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide, or transfer the data from the instrument to the computer, save as text files, print, and submit.

E. End-to-end cabling will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

END OF SECTION 280513

SECTION 280544 - SLEEVES AND SLEEVE SEALS FOR ELECTRONIC SAFETY AND SECURITY PATHWAYS AND CABLING

PART 13 - GENERAL

13.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, that apply to this Section.

13.2 SUMMARY

A. Section Includes:

1. Sleeves for pathway and cable penetration of non-fire-rated construction walls and floors.
2. Sleeve-seal systems.
3. Sleeve-seal fittings.
4. Grout.
5. Silicone sealants.

B. Related Requirements:

1. Section 078413 "Penetration Firestopping" for penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.
2. penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.

13.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. LEED Submittals:

1. Product Data for Credit EQ 4.1: For sealants, documentation including printed statement of VOC content.
2. Laboratory Test Reports for Credit EQ 4: For sealants, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 14 - PRODUCTS

14.1 SLEEVES

A. Wall Sleeves:

1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.
2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral water stop unless otherwise indicated.

B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

C. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.

D. Molded-PVC Sleeves: With nailing flange for attaching to wooden forms.

E. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.

F. Sleeves for Rectangular Openings:

1. Material: Galvanized-steel sheet.
2. Minimum Metal Thickness:

    a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and with no side larger than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
    b. For sleeve cross-section rectangle perimeter 50 inches (1270 mm) or more and one or more sides larger than 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

14.2 SLEEVE-SEAL SYSTEMS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and pathway or cable.

1. Hilti

2. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: Stainless steel.
4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

14.3 SLEEVE-SEAL FITTINGS

A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit shall have plastic or rubber waterstop collar with center opening to match piping OD.

1. Hilti

14.4 GROUT

A. Description: Non-shrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.

B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

14.5 SILICONE SEALANTS

A. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below.

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.
2. Sealant shall have VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Silicone Foams: Multicomponent, silicone-based, liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.

PART 15 - EXECUTION

15.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

A. Comply with NECA 1.

B. Comply with NEMA VE 2 for cable tray and cable penetrations.

C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:

1. Interior Penetrations of Non-Fire-Rated Walls and Floors:

    a. Seal annular space between sleeve and pathway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Section 079200 "Joint Sealants."
    b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.

2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
3. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pathway or cable unless sleeve seal is to be installed or unless seismic criteria require different clearance.
4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level. Install sleeves during erection of floors.

D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:

1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.

E. Roof-Penetration Sleeves: Seal penetration of individual pathways and cables with flexible boot-type flashing units applied in coordination with roofing work.

F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

G. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between pathway or cable and sleeve for installing sleeve-seal system.

15.2 SLEEVE-SEAL-SYSTEM INSTALLATION

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at pathway entries into building.

B. Install type and number of sealing elements recommended by manufacturer for pathway or cable material and size. Position pathway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pathway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

15.3 SLEEVE-SEAL-FITTING INSTALLATION

A. Install sleeve-seal fittings in new walls and slabs as they are constructed.

B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position water stop flange to be centered in concrete slab or wall.

C. Secure nailing flanges to concrete forms.

D. Using grout, seal the space around outside of sleeve-seal fittings.

END OF SECTION 280544

SECTION 281300 - ACCESS CONTROL

PART 16 - GENERAL

16.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, specifications and drawings.

16.2 SUMMARY

A. This Section includes access control system equipment, peripheral devices and low voltage systems.

16.3 EQUIPMENT DESCRIPTION

A. System shall consist of customer provided servers, work stations, operating software, network switches and routing, equipment.

B. Contractor shall provide new network controllers interface peripheral devices, fiber extenders, media converters, card readers, request to exit motion sensors, door contacts for monitoring door status, all new systems enclosures, low voltage power systems, peripheral hardware as needed for a complete and working system. All new wiring needed for new and existing ACS equipment.

16.4 PERFORMANCE REQUIREMENTS

A. All of the listed following listed manufactures are minimum (except as previously specified as no exception).

16.5 SUBMITTALS

A. Product Data: For each type of product indicated. Include operating characteristics, furnished specialties, and accessories. Reference each product to a location on Drawings. Test and evaluation data presented in Product Data shall meet minimum requirements.

B. Shop Drawings:

1. Diagrams for cable management system.
2. System labeling schedules, including electronic copy of labeling schedules.
3. Wiring Diagrams. Show typical wiring schematics including the following:

    a. Switch port numbers and locations.
    b. Panel wiring using all field as-built drawings.
    c. All equipment installation details.

4. As-built cable installation drawings for inside and outside plant cabling.
5. All power calculations for each enclosure and all low voltage power supplies including battery backup.

C. Project planning documents as specified in Part 3.

D. Samples: All items that will be visible below the ceiling or exposed on the wall will need prior approval before installation.

E. Field Test reports with the technician's name and date of the test signed by the customer PM. The systems will not be accepted until this is provided by the contractor.

F. Operation and Maintenance Data: For all ACS and VMS software and equipment installed to include in emergency, operation, and maintenance manuals. "Operation and Maintenance Data" include the following:

1. System minimum requirements

2. Software documentation.
3. Installation and operating documentation, manuals, and software for the Server/PC and all installed peripherals. Software shall include system restore, emergency boot diskettes, and drivers for all installed hardware. Provide separately for each Server/PC.
4. Hard copies of manufacturer's specification sheets, operating specifications, design guides, user's guides for software and hardware, and PDF files on CD-ROM of the hard-copy submittal.
5. System installation and setup guides, with data forms to plan and record options and setup decisions.

16.6 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

1. The contractor shall provide in their bid documents resumes for all employees that will be working on these projects. Not providing this information will be considered a "NO BID".

2. The submitted resumes and employees that represent will be the technician that will be on these projects. Any substitutions will require prior approval from the PM and submission of the new technicians qualifications.

B. Safety requirements: At least one of the resumes submitted by the contractor must contain a safety person with a 30-hour OSHA card.

C. Source Limitations: Products marked or manufactured in "CHINA" will not be accepted.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

E. Comply with ANSI/UL294/294B – Standard for ACS, ANSI/UL2044 – Standard for Commercial Closed Circuit Television Equipment."

16.7 CONTROLLERS

A. Controllers: Intelligent peripheral control unit, complying with UL 294, that stores time, date, valid codes, access levels, and similar data downloaded from the Central Station or workstation for controlling its operation. All Controllers shall be HID

B. No multipurpose controllers will be accepted for the scope of this project.

C. Battery Backup: Sealed, lead acid; sized to provide run time during a power outage of 120 minutes, complying with UL 924A shall be used unless the systems are on backup generator power. The systems that are on generator power shall size the batteries to carry all load's and function's for a minimum of 15 minutes.

16.8 LOW VOLTAGE POWER

A. Individual power supplies shall be used for controller and peripheral devices. Locks will not share power with any other devices. All locks shall be powered from contractor supplied power source.

B. Power supplies shall provide 8 hours of back up at 70 percent load if not on generator back up. If the systems are on Generator back up the batteries shall hold for a minimum of 20 minutes to allow start up and load stabilization of all systems.

C. Low voltage supplies shall be UL listed for the use (ACS, CCTV, IDS) with individual fused or protected outputs. No power shall be supplied from the system controllers except for card readers. All locks will have an isolation relay that the door controller will toggle.

D. All relay boards and fused output boards will be by the same manufacturer as the Low Voltage Power supplies. No mixing will be allowed.

16.9 CARD READERS W/KEYPADS

A. Power: Card reader shall be powered from its associated Controller, including its standby power source.

B. Enclosure: Suitable for surface, semi-flush, or pedestal mounting. Mounting types shall additionally be suitable for installation in the following locations:

1. Indoors, controlled environment.
2. Indoors, uncontrolled environment.
3. Outdoors, with built-in heaters or other cold-weather equipment to extend the operating temperature range as needed for operation at the site.

C. Keypad and Wiegand Swipe Reader Combination: Designed to require an entry on the keypad before presenting the credential card.

1. Keypad: Allow the entry of four alphanumeric characters that are associated with a specific credential. Keys of keypads shall contain an integral alphanumeric/special symbols.

2. Wiegand Swipe Reader: Set up for 33 -bit data cards. Comply with SIA AC-01.

3. All card readers shall be Near Field Communications (NFC) capable, HID RPK40 multiclass SE Card Reader W/Keypad minimum.

16.10 DOOR, GATE HARDWARE AND GATE OPERATOR INTERFACE

A. Exit Device with Alarm: ALL RFE devices shall be equipped with an internal alarm sounder

B. Exit Alarm: Operation of a monitored door shall generate an alarm.

C. Electric Door Strikes: Electric strikes are specified in Division 08 "Door Hardware."

D. Vehicle Gate Operator: Interface electrical operation of gate with controls of this Section. Vehicle gate operators shall be connected, monitored, and controlled, by the security access Controllers. Vehicle gate and accessories are specified in Division 32 Section "Chain Link Fences and Gates."

a. System shall be able to transmit an individual message from any alarm input to an ACS monitoring system.
b. System shall be able to append to each message a predefined set of character strings as a prefix and suffix.

16.11 VIDEO AND CAMERA CONTROL

A. Genetec VMS

B. Axis encoders, Q7436 blade for existing cameras. They shall be in a rack mountable Axis 291 – 1 (U) minimum with Ethernet and power.

16.12 REQUEST TO EXIT (RTE) MOTION SENSOR

A. Bosch DS 160 High Performance Request to Exit sensors shall be able to respond to motion on approach. The approach coverage shall be adjustable. (minimally acceptable device)

B. The RTE shall have two sets of contacts plus a set for tamper

C. The RTE shall be powered from an individual fused output. No shared power for devices.

D. The RTE shall have no bounce or issue with doors and closers that move at variable rates.

E. All RTE motion sensors shall be from the same manufacturer and shall be the same color.

16.13 DOOR POSITION MONITORING DEVICES

A. Minimum requirements for these devices will be met or the devices will be rejected during the submittal process and will slow the contractor start date as required by contract. Reed switch technology will not be acceptable.

B. The switches shall have two individual switch contacts inside. One to be used for the ACS and one to be used for the Intrusion detection system (existing ACS doors with IDS contacts will be moved to the new switches, but will remain on the separate IDS system for now).

C. Recessed switches shall be used where they can be easily installed. The switches shall be designed specifically for the door they are installed on. Some doors will require surface mounted switches. No exposed cable will be allowed on this project. All wire mold will require prior approval before being installed for any device.

16.14 CARD READER EXTENDER

A. Comnet FDW 1000/R minimum acceptable unit will be required for remote readers at automatic gates. No remote network controllers or door controllers will be allowed at gates.

B. Comnet FDW 1000/C units will be located with the V100 panel inside the IT space of the building being protected by the gates.

16.15 I.P., SIP OUTDOOR INTERCOM

A. These outdoor intercom devices shall be be CISCO compatible including the operation of QOS on the network. The devices will require prior approval of the customer during the submittal process.

16.16 CARD READER INTERCOM PEDESTAL

A. The pedestal shall have a face plate large enough to accommodate both devices and and hood shall protect both devices from direct sun light and in climate weather. These devices shall need prior approval.

16.17 CAMERAS FOR ALTERNATE PROJECTS

A. All cameras shall be Axis only no substitutions.

PART 17 - EXECUTION

17.1 EXAMINATION

A. Examine pathway elements intended for cables. Check raceways, cable trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation.

B. Examine roughing-in for LAN and control cable conduit systems to PCs, Controllers, card readers, and other cable-connected devices to verify actual locations of conduit and back boxes before device installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

17.2 PREPARATION

A. Comply with recommendations in SIA CP-01.

B. Comply with EIA/TIA-606, "Administration Standard for the Telecommunications Infrastructure of Commercial Buildings."

C. Obtain detailed Project planning forms from manufacturer of access-control system; develop custom forms to suit Project. Fill in all data available from Project plans and specifications and publish as Project planning documents for review and approval.

1. Record setup data for control station and workstations.
2. For each Location, record setup of Controller features and access requirements.
3. Propose start and stop times for time zones and holidays, and match up access levels for doors.
4. Set up groups, facility codes, linking, and list inputs and outputs for each Controller.
5. Assign action message names and compose messages.
6. Set up alarms. Establish interlocks between alarms, intruder detection, and video surveillance features.
7. Prepare and install alarm graphic maps.
8. Develop user-defined fields.
9. Develop screen layout formats.
10. Propose setups for guard tours and key control.
11. Discuss badge layout options; design badges.

12. Complete system diagnostics and operation verification.
13. Prepare a specific plan for system testing, startup, and demonstration.
14. Develop acceptance test concept and, on approval, develop specifics of the test.
15. Develop cable and asset management system details; input data from construction documents. Include system schematics and Visio Technical Drawings.

D. In meetings with PM and Owner, present Project planning documents and review, adjust, and prepare final setup documents. Use final documents to set up system software.

17.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Testing Agency: Engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports:

C. Perform the following field tests and inspections and prepare test reports:

1. LAN Cable Procedures: Inspect for physical damage and test each conductor signal path for continuity and shorts. Use Class E/D/F, bidirectional, Category 6 tester. Test for faulty connectors, splices, and terminations. Test according to TIA/EIA-568-1, "Commercial Building Telecommunications Cabling Standards - Part 1 General Requirements." Link performance for UTP cables must comply with minimum criteria in TIA/EIA-568-B.
2. Test each circuit and component of each system. Tests shall include, but are not limited to, measurements of power supply output under maximum load, signal loop resistance, and leakage to ground where applicable. System components with battery backup shall be operated on battery power for a period of not less than 10 percent of the calculated battery operating time. Provide special equipment and software if testing requires special or dedicated equipment.
3. Operational Test: After installation of cables and connectors, demonstrate product capability and compliance with requirements. Test each signal path for end-to-end performance from each end of all pairs installed. Remove temporary connections when tests have been satisfactorily completed.

D. Remove and replace malfunctioning devices and circuits and retest as specified above.

17.4 STARTUP SERVICE

A. Engage a factory-authorized service representative to supervise and assist with startup service. Complete installation and startup checks according to approved procedures that were developed in " Preparation" Article and with manufacturer's written instructions.

17.5 PROTECTION

A. Maintain strict security during the installation of equipment and software. Rooms housing the control station, and workstations that have been powered up shall be locked and secured, with an activated burglar alarm and access-control system reporting to a Central Station complying with UL 1610, "Central-Station Burglar-Alarm Units," during periods when a qualified operator in the employ of Contractor is not present.

SECTION 281301 UNIFIED SECURITY SYSTEM

PART 1 UNIFIED SECURITY PLATFORM (USP)

1.01 General

A The Unified Security Platform (USP) shall be an enterprise class IP-enabled security and safety software solution.

B The USP shall support the seamless unification of IP access control system (ACS) and IP video management system (VMS) under a single platform. The USP user interface (UI) applications shall present a unified security interface for the management, configuration, monitoring, and reporting of embedded ACS and VMS systems and associated edge devices.

C Functionalities available with the USP shall include:

01 Configuration of embedded systems such as ACS and VMS systems.

02 Live event monitoring.

03 Live video monitoring and playback of archived video.

04 Alarm management.

05 Reporting, including creating custom report templates and incident reports.

06 Federation for global monitoring, reporting, and alarm management of multiple remote and independent ACS and/or VMS systems spread across multiple facilities and geographic areas.

07 Global cardholder management across multiple facilities and geographic areas each with their own independent ACS system.

08 Microsoft Active Directory integration for synchronizing USP user accounts and ACS cardholder accounts.

09 Intrusion detection system (IDS) and panel integration (live monitoring, reporting, and arming/disarming).

10 SIP Intercom device integration for bi-directional communication.

11 Integration to third party systems and databases via plug-ins (access control, video analytics, point of sale, and more).

12 Dynamic graphical map viewing.

13 Asset management system integration.

D The USP shall be deployed in one or more of the following types of installations:

01 Unified access and video platform, and any combination thereof.

02 Standalone access control, intrusion detection or video platform.

03 Unified access, intrusion and video platform that federates multiple remote ACS, IDS and VMS.

04 Standalone video platform that federates multiple independent remote VMS.

05 Standalone access control that federates multiple independent remote ACS.

E Licensing

01 A single central license shall be applied centrally on the configuration server.

02 There shall be no requirement to apply a license at every server computer or client workstation.

03 Based on selected options, one or more embedded systems shall be enabled or disabled.

1.02 Hardware and Software Requirements

A The USP and embedded systems (video, license plate recognition, access control) shall be designed to run on a standard PC-based platform loaded with a Windows operating system.

B The server software module (SSM) shall be compatible with both 32-bit and 64-bit operating systems including Windows Vista, Windows 7, Windows 10, Windows Server 2003, Windows Server 2008, and Windows Server 2012. Refer to latest USP workstation, server, and operating systems specifications for more information.

C The client modules shall run on Windows Vista, Windows 7 or Windows 10.

D The core client/server software shall be built in its entirety using the Microsoft .NET software framework and the C# (C-Sharp) programming language.

E The USP database server(s) shall be built on Microsoft's SQL Server 2008, SQL Server 2012.

F The USP shall be compatible with virtual environment including VMware 5.1. (This is the preferred method for all servers and work stations).

G The USP shall use the latest user interface (UI) development and programming technologies such as Microsoft WPF (Windows Presentation Foundation), the XAML markup language, and .NET software framework.

END OF SECTION

PART 2 ARCHITECTURE

2.01 Overview

A The USP shall be based on a client/server model. The USP shall consist of a standard Server Software Module (SSM) and Client Software Applications (CSA).

B The USP shall be an IP enabled solution. All communication between the SSM and CSA shall be based on standard TCP/IP protocol and shall use encryption when enabled by the administrator.

C The SSM shall be a Windows service that can be configured to start when the operating system is booted and run in the background. The SSM shall automatically launch at computer startup, irrespective of whether a user is logged onto the machine or not.

D Users shall be able to deploy the SSM on a single server or across several servers for a distributed architecture. The USP shall not be restricted in the number of SSM deployed.

E The USP shall support the concept of Federation whereby multiple independent ACS and VMS installations can be merged into a single large virtual system for centralized monitoring, reporting, and alarm management.

F The USP shall protect against potential database server failure and continue to run through standard off-the-shelf solutions.

G The USP shall support one thousand instances of Client Software Applications (CSA) connected at the same time. An unrestricted number of CSA however can be installed at any time.

H The USP shall support an unrestricted number of logs and historical transactions (events and alarms) with the maximum allowed being limited by the amount of hard disk space available.

I The USP shall support uninterrupted video streaming. The CSA shall keep existing video connections active in the eventuality that an SSM (except Archiver) becomes unavailable.

2.02 Roles-Based Architecture

A The USP shall consist of a role-based architecture, with each SSM hosting one or more roles.

B Each role shall execute a specific set of tasks related to either core system, video (VMS), intrusion detection system (IDS) or access control (ACS) functionalities, among many others. Installation shall be streamlined through the USP`s abilities to allow administrators to:

01 Deploy one or several SSM across the network prior to activating roles.

02 Activate and deactivate roles as needed on each and every SSM.

03 Centralize role configuration and management.

04 Support for remote configuration.

05 Move roles over from one SSM to another.

C Each role, where needed, shall have its own database to store events and role-specific configuration information.

D Roles without databases (Federation, Active Directory, Global Cardholder Management) shall support near real-time standby without any third party failover software being required.

2.03 Standard Roles

A Directory Role

01 The Directory Role shall manage the central database that contains all the system information and component configuration of the USP.

02 The Directory Role shall authenticate users and give access to the USP based on predefined user access rights or privileges, and security partition settings.

03 The Directory Role shall support the configuration/management of the following components common to the ACS, IDS, and VMS sub-systems:

a) Security Partitions, users and user groups.

b) Areas.

c) Zones, input/output (IO) linking rules, custom output behavior.

d) Alarms, Schedules, scheduled tasks.

e) Custom events.

f) Macros or custom scripts.

04 The Directory Role shall support the configuration/management of the following components specific to VMS:

a) Video servers and their peripherals (e.g. audio, IOs, serial ports).

b) PTZ.

c) Camera sequences.

d) Recording and archiving schedules.

05 The Directory Role shall support the configuration/management of the following components specific to ACS:

a) Door controllers, input and output (IO) modules.

b) Doors, Elevators, Access rules.

c) Cardholders and cardholder groups, credentials, and badge templates.

B Video Archiver Role shall be responsible for managing cameras and encoders under its control and archiving video.

C Media Router Role shall be responsible for routing video and audio streams across local and wide area networks from the source (e.g. DVS) to the destination (e.g. CSA).

D Access Manager Role shall be responsible for synchronizing access control hardware units under its control, such as door controllers and IO modules. It shall also be able to validate and log all access activities and events when the door controllers and IO modules are online.

E Zone Manager Role shall be responsible for managing all software zones (collection of inputs) and logging associated zone events. Zones shall consist of inputs from both access control and video devices.

F Health Monitoring Role shall be responsible for monitoring and logging health events and warnings from the various client applications, roles, and services that are part of the USP. This role shall also be responsible for logging events within the Windows Event Log, generating reports on health statistics and health history.

2.04 Optional Roles

A Federation Role shall be responsible for creating a large virtual system consisting of hundreds or thousands of independent and remote ACS and/or VMS systems.

B Global Cardholder Synchronizer Role shall be responsible for synchronizing cardholder and credential data between the local site and a central site. Synchronization between remote sites shall also be supported.

C Active Directory Role shall be responsible for synchronizing user accounts and cardholder accounts with a Microsoft Active Directory server.

D Intrusion Manager Role shall be responsible for managing third party intrusion devices such as alarm panels and perimeter detection devices. Intrusion Manager Role shall also log all intrusion events in a database.

E Asset Manager Role shall be responsible for integrating and synchronizing with third party asset management systems and logging asset related events. This role shall also support the execution of asset-related reports such as inventory reports and asset activity reports.

F Plug-in Manager Role shall be responsible for the communications between the USP and third party systems such as video analytics, access control and video systems, and building management systems.

G Point of Sale (POS) Manager Role shall be responsible for integrating the USP with third party POS systems and logging transactions.

H Web SDK Role shall be responsible for connecting the USP to any application or interface developed with the Web Service SDK. Applications developed with the Web Service SDK shall be platform independent and rely on the REST protocol for communications.

I Communication Management Role shall be responsible for registering the SIP communication endpoints and managing the call routing.

J RTSP Role shall allow to connect from a third party to any video stream of the system using standard RTSP protocol. RTSP shall provide access to video live as well as playback.

2.05 Server Monitoring Service (Watchdog)

A The USP shall include a Server Monitoring Service that continuously monitors the state of the Server Software Module (SSM) service.

B The Server Monitoring Service shall be a Windows service that automatically launches at system startup, irrespective of whether a user is logged into his account or not.

C The Server Monitoring Service shall be installed on all PCs/servers running an SSM. In the event of a malfunction or failure, the Server Monitoring Service shall restart the failed service. As a last resort, the Server Monitoring Service shall reboot the server/PC should it be unable to restart the service.

END OF SECTION

PART 3 CLIENT SOFTWARE APPLICATIONS (CSA)

3.01 Overview

A The Client Software Applications (CSA) shall provide the user interface for USP configuration and monitoring over any network, accessible locally or from a remote connection.

B The CSA shall consist of the Configuration UI for system configuration and the Surveillance UI for monitoring. The CSA shall be Windows based and provide an easy-to-use graphical user interface (UI).

C The Server Administrator shall be used to configure the server database(s). It shall be web-based and accessible locally on the SSM or across the network.

D The CSA shall seamlessly merge access control, intrusion detection, and video functionalities within the same user application.

E The USP shall use the latest user interface (UI) development and programming technologies such as Microsoft WPF (Windows Presentation Foundation), the XAML markup language, and the .NET software framework.

F All applications shall provide an authentication mechanism, which verifies the validity of the user. As such, the administrator (who has all rights and privileges) can define specific access rights and privileges for each user in the system.

G Logging on to a CSA shall be done using the operators Windows credentials using Active Directory integration.

H When integrated with Microsoft's Active Directory, the CSA and USP shall authenticate users using their Windows credentials. As such, the USP will benefit from Active Directory password authentication and strong security features.

I The CSA shall support multiple languages, including but not limited to the following: English, French, Arabic, Czech, Dutch, German, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Persian (Farsi), Polish, Portuguese (Brazilian), Simplified and Traditional Chinese, Russian, Spanish, Swedish, Thai and Turkish.

J The Configuration UI and Surveillance UI shall support many of the latest UI concepts to enhance usability and operator efficiency such as

01 A customizable Home Page including favorite and recently used tasks.

02 Task-oriented approach for administrator/operator activities where each type of activity (surveillance, visitor management, individual reports, and more) is an operator task.

03 Consolidated and consistent workflows for VMS, IDS, and ACS.

04 Single click functionality for reporting and tracking. The Surveillance UI shall support single-click reporting for ACS, IDS, and VMS, as well as single-click tracking of areas, cameras, doors, zones, cardholders, elevators, and more. Single-click reporting or tracking shall create a new task with the selected entities to report on or to track.

K Configuration UI and Surveillance UI Home Page and Tasks

01 The Configuration UI and Surveillance UI shall be task-oriented.

02 A task shall be user interface design patterns whose goal is to simplify the user interface by grouping related features from different systems such as video and access in the same display window. Features are grouped together in a task based on their common relevance to help the user perform a specific task.

03 Tasks shall be accessible via the Configuration or the Surveillance CSA's Home Page.

04 Newly created tasks shall be accessible via the Configuration UI or the Surveillance UI taskbar.

05 Similar tasks shall be grouped into the following categories:

a) Operation: Access control management, IDS management, and more.

b) Investigation: Video bookmark/motion/archive reports, access control activity reports, visitor activity reports, alarm reports, VMS activity reports, and more.

c) Maintenance: Access control and video configuration reports, troubleshooters, audit trails, health-related reports, and more.

06 An operator shall be able to launch a specific task only if he has the appropriate privileges.

07 The Home Page content shall be customizable through the use of privileges to hide tasks an operator should not have access to and through a list a favorite and recently used tasks. Further to that, editing a USP XML file to add new tasks on the fly shall be possible.

3.02 Configuration User Interface (UI)

A The Configuration UI application shall allow the administrator or users with appropriate privileges to change the system configuration. The Configuration UI shall provide decentralized configuration and administration of the USP system from anywhere on the IP network.

B The configuration of all embedded ACS, VMS, and IDS systems shall be accessible via the Configuration UI.

C The Configuration UI shall have a home page with single-click access to various tasks.

D The Configuration UI shall include a variety of tools such as troubleshooting utilities, import tools, and a unit discover tool, amongst many more.

E The Configuration UI shall include a static reporting interface to:

01 View historical events based on entity activity. The user shall be able to perform actions such as printing a report and troubleshooting a specific access event from the reporting view.

02 View audit trails that show a history of user/administrator changes to an entity.

F Common entities such as users, schedules, alarms and many more, can be reused by all embedded systems (ACS, VMS, and IDS).

3.03 Surveillance User Interface (UI)

A The Surveillance UI shall fulfill the role of a Unified Security Interface able to monitor video, IDS, and access control events and alarms, as well as video live and recorded video.

B The Surveillance UI shall provide a graphical user interface to control and monitor the USP over any IP network. It shall allow administrators and operators with appropriate privileges to monitor their unified security platform, run reports, and manage alarms.

C The Surveillance UI shall support the following UI concepts to enhance usability and operator efficiency such as:

01 Dynamically adaptive interface that adjusts in real-time to what the operator is doing.

02 A dynamic dashboard loaded with entity-specific widgets, e.g. door and camera widget.

03 Use of transparent overlays that can display multiple data in a seamless fashion.

04 Display tile menus and quick commands.

05 Consolidated and consistent workflows.

06 Tile menus and quick commands easily accessible within every display tile of the user workspace.

07 Single click functionality for reporting and tracking. The Surveillance UI shall support single-click reporting for access control, IDS, and video, as well as single-click tracking of areas, cameras, doors, zones, cardholders, elevators, IDS entities, and more. Single-click reporting or tracking shall create a new task with the selected entities to report on or to track.

D Surveillance UI Home Page and Tasks

01 Similar tasks shall be grouped into the following categories:

a) Operation: Access control/IDS/video surveillance, visitor management, mustering, access control and video alarm monitoring, and more.

b) Investigation: Video bookmark/motion/archive reports, access control activity reports, visitor activity reports, alarm reports, IDS activity reports, and more.

c) Maintenance: Access control and video configuration reports, troubleshooters, audit trails, and more.

E Dynamically Adaptive UI, Dashboard, and Widgets

01 The Surveillance UI shall dynamically adapt to what the operator is doing. This shall be accomplished through the concept of widgets that are grouped in the Surveillance UI dashboard.

02 Widgets are mini-applications or mini-groupings in the Surveillance UI dashboard that let you perform common tasks and provide you with fast access to information and actions.

03 With a single click on an entity (e.g. door or camera) the specific widgets associated to that entity appear and other non-relevant widgets disappear dynamically (instantly). Widgets shall bring the operator information such as door status and camera stream information, as well as user actions such, door unlock, PTZ controls, and more.

04 Specific widgets include those for a door, camera, alarm, zone, display tile, video stream (statistics), PTZ camera, and more.

F Operator Workflows

01 A workflow shall be a sequence of operations an operator or administrator shall execute to complete an activity. The “flow” relates to a clearly defined timeline or sequence for executing the activity.

02 The Surveillance UI shall be equipped with consistent workflows for the IDS, video, and access control systems it unifies.

03 Generating or printing a report, setting up or acknowledging an alarm, or creating an incident report shall follow the same process (workflow) whether the operator is working with video, IDS, or access control, or both video and access control.

G Each task within the surveillance UI shall consist of one or more of the following items:

01 Event list.

02 Logical tree. Doors, cameras, zones, IDS units, and elevators shall be grouped under Areas in a hierarchical fashion.

03 Entities list of all entities being tracked.

04 Display tiles with various patterns (1 x 1, 2 x 2, and more).

05 Display tile menu with various commands related to cameras, doors, PTZ, and tile controls.

06 Dashboard with widgets.

H The Surveillance UI shall support multiple event lists and display tile patterns, including:

01 Event/alarm list layout only

02 Display tile layout only

03 Display tile and alarm/event list combination

04 IDS map and alarm/event list combination

I User workspace customization

01 The user shall have full control over the user workspace through a variety of user-selectable customization options. Administrators shall also be able to limit what users and operators can modify in their workspace through privileges.

02 Once customized, the user shall be able to save his workspace.

03 The user workspace shall be accessible by a specific user from any client application on the network.

04 Display tile patterns shall be customizable.

05 Event or alarm lists shall span anywhere from a portion of the screen up to the entire screen, and shall be resizable by the user. The length of event or alarm lists shall be user-defined. Scroll bars shall enable the user to navigate through lengthy lists of events and alarms.

06 The Surveillance UI shall support multiple display tile patterns, e.g. 1 display tile (1x1 matrix), 16 tiles (8x8 matrix), and multiple additional variations.

07 The Surveillance UI shall support as many monitors as the PC video adapters and Windows Operating System are capable of accepting.

08 Additional customization options include: show/hide window panes, show/hide menus/toolbars, show/hide overlaid information on video, resize different window panes, choice of tile display pattern on a per task basis.

J The Surveillance UI shall provide an interface to support the following tasks and activities common to access control, IDS, and video:

01 Monitoring the events from a live security system (ACS and/or VMS and/or IDS).

02 Generating reports, including custom reports.

03 Monitoring and acknowledging alarms.

04 Creating and editing incidents and generating incident reports.

05 Displaying dynamic graphical maps and floor plans. Executing actions from a dynamic graphical map and floor plan.

06 Management and execution of hot actions and macros.

K The Surveillance UI shall be able to monitor the activity of the following entities in real-time through the surveillance task, among others: areas, IDS entities, doors, elevators, cameras, cardholders, cardholder groups, zones (input points), and more. The Surveillance UI shall provide an interface to support the following access control tasks and capabilities:

01 Monitoring and management of access events and alarms.

02 Viewing of cardholder picture or badge IDs.

03 Verification of cardholder picture IDs against live video.

04 Visitor management.

05 People counting or mustering, including resetting the people count in an area

06 Door control (remotely unlocking doors, overriding a door's unlocking schedules, enabling door maintenance mode).

07 Forgiving antipassback.

08 Generation of ACS configuration and activity reports.

09 Viewing of HTML files including alarm instructions.

L The Surveillance UI shall include advanced video capabilities:

01 Advanced live video viewing functionality.

02 Advanced archive playing and video playback functionality.

03 Monitoring and management of video system events and alarms.

04 Intercom or duplex audio.

05 Generation of video reports.

06 Control of PTZ cameras.

07 Creating and Monitoring archive transfer requests

08 Display overlay metadata over the video live or playback

M The Surveillance UI shall leverage Graphical Processing Unit (GPU) for video decoding.

01 The following GPU technologies shall be supported:

a) NVidia CUDA

b) Intel Quick Sync

02 The Surveillance UI shall have the ability to decode the video with an optimal usage of simultaneously Graphical Possessing Unit (GPU) and Computer Processing Unit (CPU)

N The Surveillance UI's video live viewing capabilities shall include:

01 Display of all cameras attached to the USP and all cameras attached to federated systems.

02 Shall support live video monitoring on each and every display tile within a task in the user's workspace.

03 The USP shall support uninterrupted video streaming. The CSA shall keep existing video connections active in the eventually that a SSM (except Archiver) become unavailable.

04 The operator shall be able to drag and drop a camera into a display tile for live viewing.

05 The operator shall be able to drag and drop a camera into a display tile for live viewing on an analog monitor connected to a IP hardware decoder (converting IP encoded stream into analog video signal).

06 The operator shall be able to drag and drop a camera from a map into a display tile for live viewing.

07 Shall support digital zoom on live camera video streams.

08 Shall allow for audio communication with video units with audio input and output.

09 The operator shall be able to control pan-tilt-zoom, iris, focus, and presets.

10 Shall allow operators to bookmark important events for later retrieval on any archiving camera. Operators can uniquely name each bookmark in order to facilitate future searches.

11 The operator shall be able to start/stop recording on any camera in the system, which is configured to allow manual recording, by clicking on a single button.

12 The operator shall have the capability to activate or de-activate viewing of all system events as they occur.

13 Shall allow operators to switch to instant replay of the video for any archiving camera with the simple click of button.

14 Users shall be able to take snapshots of live video and be able to save or print the snapshots.

15 The user shall be able to view the same camera multiple times in different tiles.

O The Surveillance UI's video playback (archive playing) capabilities shall include:

01 Shall support audio and video playback of any time span.

02 Shall support video playback on each and every display tile.

03 Shall allow operators to switch to instant replay of the video for any archiving camera with the simple click of button.

04 Shall allow the operator to select between instant synch of all video streams in playback mode allowing operators to view events from multiple angles or across several camera fields, or non-synchronous playback.

05 Shall allow the operator to simultaneously view the same camera in multiple tiles at different time intervals.

06 Shall allow the operator to control the playback with:

a) Pause

b) Lock Speed

c) Forward and Reverse Playback at: 1x, 2x, 4x, 6x, 8x, 10x, 20x, 40x, 100x.

d) Forward and Reverse Playback frame by frame

e) Slow Forward and Reverse Playback at: 1/8x, 1/4x, 1/3x, 1/2x.

f) Loop playback between two time markers

07 Shall display a single timeline, or optionally one timeline for each selected video stream, with which the operator can navigate through the video sequence by simply clicking on any point in the timeline.

08 Shall display the level of motion at any point on a timeline.

09 Shall clearly display bookmarks events on the timeline(s).

10 Shall be able to query archived video using various search criteria, including but not limited to, time, date, camera, and area, among others.

11 Shall provide the tool to search video and associated audio on user-defined events or motion parameters.

12 Shall allow operators to define an area of the video field in which to search for motion as well as define the amount of motion that will trigger search results. The Surveillance

UI then retrieves all archived video streams which contain motion which meets the search parameters. There shall be a graphical timeline where the time of each search hit shall be indicated.

13 Shall allow operators to browse through a list of all bookmarks created on the system and select any bookmarked event for viewing.

14 Shall allow the user to add bookmarks to previously archived video for easier searching and retrieval.

15 Shall support digital zoom on playback video streams.

16 Shall provide still image export to PNG, JPEG, GIF, and BMP format with Date and Time stamp, and Camera Name on the image (snapshot).

17 Shall provide tools to export video and a self-contained video player on various media such as a USB keys, CD/DVD-ROM. This video player shall be easy to use without training and shall still support to review video metadata such as bookmark or navigate the video with function like panoramic camera view de-warping.

18 Shall provide tools to export video sequences in standard video formats, such as ASF.

19 Shall provide the ability to encrypt exported video files

20 Shall allow operators to load previously exported video files from their computer or network.

21 Shall allow queries to be saved upon closing the CSA and reappear when the application is reopened.

22 Shall allow operators to block, on demand, video stream dynamically to lower level users to prevent access, for a specific time, to live and recorded video.

23 Shall provide a tool to build and export a set of video into a single container. This tools shall allow to build sequences of video to create a storyboard and allow the export of synchronous cameras.

24 Shall enforce the video export and still image export to be stored on a pre-defined storage location.

25 Shall provide an interface to list, search and manipulate the video exports previously generated.

P Tracking

01 The USP shall permit the user to select multiple entities to monitor from the Surveillance UI by adding the entities one by one to the tracking list.

02 The Surveillance UI shall provide the option to filter which events shall be displayed in the display tile layout and/or event list layout.

03 It shall be possible to lock a Surveillance UI display tile so that it only tracks the activity of a specific entity, e.g. specific door or camera.

04 The user shall be able to drag and drop an event from an event list (or an alarm from an alarm list) onto a display tile to view a license plate read, cardholder picture ID, badge ID, or live/archived video, among other options.

05 Event, alarm, monitoring/tracking, and report lists shall contain cardholder pictures, where applicable.

06 The user shall be permitted to start or pause the viewing of events within each display tile.

Q Display Tile Packing and Unpacking

01 The Surveillance UI shall support single-click unpacking and packing for areas, doors, zones, camera sequences, and alarms.

02 Packing and unpacking of entities shall allow operators to quickly obtain additional information and camera views of a specific entity.

03 Unpacking of an entity shall display associated entities. For example, unpacking a door with multiple associated cameras shall display all cameras associated to the door. Unpacking shall reconfigure the display tiles to be able to display all associated entities. For example, unpacking a door (or zone, or alarm) that is currently in a 1 x 1 tile configuration and that has 3 cameras tied to it will create a 1 x 3 display tile arrangement to view all associated entities.

04 Packing will return the display to the original tile pattern.

R Visual Tracking

01 The Surveillance UI shall support the ability to manually track a moving target with the single click of a button.

02 The ability to switch from one camera view to an adjacent camera shall be done within a single display tile.

03 Switching between camera streams shall be accomplished by simply clicking on a semi-transparent shape or overlay.

04 Visual tracking shall be available with both live and recorded video.

S The following additional tools or utilities shall be available from the Surveillance UI: create credentials, create cardholders, and access control troubleshooter.

3.04 Server Administrator

A The Server Administrator shall be used to configure the SSM, as well as the Directory Role (main configuration) and its database(s), apply the license, and more.

B The Server Administrator shall be a web-based application. Through the Server Administrator, it shall be possible to access the SSM across the network or locally on the server.

C Access to the Server Administrator shall be protected via login name and password, as well as encrypted communications.

D The Server Administrator shall allow the administrator (user) to perform the following functions:

01 Manage the system license.

02 Configure the database(s) and database server for the Directory Role,

03 Activate/Deactivate the Directory Role.

04 Manually back up the Directory Role database(s) and/or restore the server database(s), as well as configure scheduled backups of the databases.

05 Define the client-to-server communications security settings.

06 Configure the network communications hardware, including connection addresses and ports.

07 Configure system SMTP settings (mail server and port).

08 Configure event and alarm history storage options.

3.05 Unified Web Client (UWC)

A The UPS shall support a unified web client (UWC) for access control, video, and IDS.

B The UWC shall be a truly thin client with no download required other than an internet web browser or standard web browser plugins.

C The UWC shall be platform independent and run within Microsoft Internet Explorer, Firefox, Safari, and Google Chrome.

D Web pages for the web client shall be managed and pushed by the Mobile Server. Microsoft IIS or any other web hosting service shall not be required given that all the web pages shall be hosted by the Mobile Server.

E Functionalities:

01 Login using Active Directory support.

02 Encrypted communications for all transactions.

03 Print reports, export to CSV file

04 Customer logo customization shall be available for multi-tenant and hosted services applications.

05 Video

a) Live and playback video 320 x 240, 640 x 480 or 1280 x 1024 @ 15 fps

b) Video export

c) 1, 4, 6 or 9 tiles

d) Basic PTZ Controls (Pan/Tilt, Zoom, go to presets, start pattern)

e) Start / Stop recording

f) Sample web page for customers to see how to view video for own development

06 Access Control

a) Cardholder and group (add/modify/delete)

b) Credential management (modify/delete)

c) Unlock door

d) Door Activities report

3.06 Smartphone and Tablet Apps

A The USP shall support mobile apps for various off-the-shelf smartphones and tablets. The mobile apps shall communicate with the USP's Mobile Server over any Wi-Fi or wireless IP connection.

B Mobile apps shall communicate with the UPS via a Mobile Server (same as the Unified Web Client or UWC). Communication between the mobile device and the Mobile Server shall support optional encryption.

C Supported devices shall include (refer to Mobile App specifications for latest compatibility list):

01 Apple iPod Touch, iPhone, and iPad.

02 RIM Blackberry smartphones

03 Android-compatible smartphones and tablets.

04 Windows 8

D It shall be possible to download the mobile apps from the Central application store (Apple iTunes App Store, Google Play, Windows Store).

E Functionalities

01 Live monitoring, command and control of the USP.

02 Receive alarm push notifications from Apple Push Notification Server Google Android push server.

03 Alarm management (view and acknowledge alarms, video tied to alarms)

04 View USP hierarchy and search for entities

05 Stream video from the mobile device using the built-in camera

a) Video streams from mobile devices shall be available in the USP to be viewed in live and recorded on the Archiver.

06 Video

a) View live and playback video at 320 x 240, 640 x 480 or 1280 x 1024 @ 15 fps

b) Monitor camera status.

c) View up to 6 video feeds.

d) Control PTZ functionality of a camera, including access to PTZ presets.

e) Save snapshots locally on the device.

f) View video tied to access control events, and alarms.

07 Access Control

a) View cardholder picture with access-related events.

b) Monitor door status.

c) Unlock door

d) Override unlocking or locking schedule.

e) Set door in maintenance mode.

END OF SECTION

PART 4 SYSTEM FUNCTIONALITY

4.01 Unification of Video and Access Control

A The Surveillance UI shall present a true Unified Security Interface for live monitoring and reporting of the ACS and VMS. Advanced live video viewing and playback of archived video shall be available through the Surveillance UI.

B The Configuration UI shall present a true Unified Security Interface for configuration and management of the ACS and VMS.

C User shall be able to associate one or more video cameras to the following entity types, among others: areas, doors, elevators, zones, alarms, and intrusion panels.

D It shall be possible to view video associated to access control events when viewing a report.

E It shall be possible to view video associated to intrusion panel events when viewing a report.

4.02 Failover and Standby Functionality

A The USP shall support native and off-the-shelf failover options.

B Failover Directory

01 The Standby Directory shall act as a replacement SSM on hot standby, ready to take over as the acting Directory in case the primary Directory fails. The failover will occur in less than 1 minute. No action from the user will be required.

02 The USP shall support up to five (5) Directories on standby, lined up to take over as the acting Directory in a cascading fashion.

03 The Standby Directory shall keep its configuration database synchronized with the primary Directory.

04 The Standby Directory shall support synchronization of the configuration databases using a backup and restore mechanism. The synchronization period shall be configurable from 15 minutes to 1 week.

05 The Standby Directory shall support real-time synchronization of the configuration databases using SQL Mirroring mechanism.

C Standby Archiver. Refer to section 6.05 Standby Archiver for more information.

D Off-the-shelf standby/failover options (excluding the VMS Archiver) shall include

01 Windows Clustering

02 NEC ExpressCluster X LAN

4.03 Third Party System Integration

A The USP shall support multiple approaches to integrating third party systems. These shall include: Software Development Kits (SDKs), Driver Development Kits (DDKs), REST-based Web Service SDKs, RTSP Service SDKs, and more.

B The USP architecture shall support the addition of new connectors to integrate to third party system integration such as:

01 Video analytics.

02 Third party video systems.

03 Third party access control systems.

04 Point-of-sale (POS) systems.

05 Building management systems.

06 Human resource management systems (HRMS).

4.04 Alarm Management

A The USP shall support the following Alarm Management functionality:

01 Create and modify user-defined alarms. An unrestricted number of user-defined alarms shall be supported.

02 Assign a time schedule or a coverage period to an alarm. An alarm shall be triggered only if it is a valid alarm for the current time period.

03 Set the priority level of an alarm and its reactivation threshold.

04 Define whether to display live or recorded video, still frames or a mix once the alarm is triggered.

05 Define the time period after which the alarm is automatically acknowledged.

06 Define the recipients of an alarm. Alarm notifications shall be routed to one or more recipients. Recipients shall be assigned a priority level which prioritizes the order of reception of an alarm.

07 Define the alarm broadcast mode. Alarm notifications shall be sent using either a sequential or an all-at-once broadcast mode.

08 Define whether to display the source of the alarm, one or more entities, or an HTML page.

09 Specify whether an incident report is mandatory during acknowledgment.

B The workflows to create, modify, add instructions and procedures, and acknowledge an alarm shall be consistent for access control, IDS, and video alarms.

C Alarms shall be federated allowing global alarm management across multiple independent USP, ACS, and VMS systems.

D The USP shall also support alarm notification to an email address or any device using the SMTP protocol.

E The ability to create alarm-related instructions shall be supported through the display of one or more HTML pages following an alarm event. The HTML pages shall be user-defined and can be interlinked.

F Alarm unpacking and packing shall be supported where all the entities associated to an alarm can be display in the Surveillance UI with the single click of button.

G User shall have the ability to acknowledge alarms, create an incident upon alarm acknowledgement, and put an alarm to snooze.

H The user shall be able to spontaneously trigger alarms based on something he or she sees in the system.

I An alarm must be configured in such a way that it remains visible until the source condition has been acknowledged

J A user must be able to investigate an alarm without acknowledging it

4.05 Threat Levels

A The USP shall support Threat Levels to dynamically change the system behavior to respond to critical events.

B Threat Levels are activated and deactivated by the CSA operator with the right privilege.

C Threat Levels can be set on an area or on the entire system.

D Threat Levels can affect the system behavior by executing any action available in the USP such as: trigger output, start recording, block camera, override recording quality, arm zone, set a door in maintenance mode, etc.

E The following specific actions shall be available with Threat Level:

01 Set minimum security clearance to restrict or permit access to cardholders on specific areas on top of the restrictions imposed by the access rules.

02 Set minimum user level to automatically log out user from the USP.

03 Set reader mode to change how the doors are accessed (e.g. card and PIN, or card or PIN).

F A visible notification shall be displayed in all operator CSA when a Threat Level is activated

4.06 Remote Task

A The USP shall provide, through a Remote Task, capabilities to remotely monitor and control the content of other workstations running the CSA (Surveillance UI) that are part of the same system.

B The USP shall support video wall applications by connecting and controlling multiple workstations and monitors simultaneously.

C The Remote Task shall be a graphical interface showing a replication of the remote workstation running the CSA (Surveillance UI).

D The Remote Task shall allow to connect to other workstations with a low bandwidth mode to receive only snapshots of the video viewed remotely.

E The Remote Task shall allow to connect to other workstations with a spy mode to remain invisible to the remotely connected workstation.

F The functionality provided by the remote monitoring and control capability shall include:

01 Remote monitoring and control of the monitoring and alarm monitoring tasks.

02 Ability to remotely switch cameras, doors and zones into display tiles.

03 Ability to remotely control live and playback video.

04 Ability to remotely change the tile pattern

05 Ability to remotely create and delete tasks

06 Ability to remotely start/stop task cycling

07 Ability to remotely go into full screen mode

08 Ability to remotely save and reload the workspace

4.07 Health Monitoring

A The USP shall monitor health of the system, log health-related events, and calculate statistics.

B USP services, roles, agents, units, and client apps will trigger health events.

C It shall populate the Windows Event Log with health events related to USP roles, services, and client apps.

D A dedicated role, the Health Monitoring Role, shall perform the following actions:

01 Monitor health of the entire system and logs events

02 Calculate statistics within specified time frame (hours, days, months)

03 Calculates availability for clients, server, video/access/LPR units

E A Health Monitoring task and Health History reporting task shall be available for live and historical reporting.

F Health events shall be accessible via the SDK (can be used to create SNMP traps)

4.08 Advanced Task Management

A The USP shall support an infrastructure for managing Surveillance UI tasks used for live monitoring, day to day activities, and reporting.

B Administrators shall be able to assign tasks and lock the operator`s workspace. User management of their workspace shall be limited by their assigned privileges.

C Operators shall be able save their tasks as either Public Tasks or Private Tasks and in a specific partition. Public tasks shall be available to all users. Private tasks shall only be available to the owner of the task.

D Operators shall be able to share their tasks by sending them to one or more online users. Recipients shall have the option to accept the sent task.

4.09 Reporting

A The USP shall support report generation (database reporting) for access control, IDS, video, and intrusion.

B Each and every report in the system shall be a USP task, each associate with its own privilege. A user shall have access to a specific report task if he or she has the appropriate privilege.

C The workflows to create, modify, and run a report shall be consistent for access control, LPR, and video reports.

D Reports shall be federated allowing global consolidated reporting across multiple independent USP, ACS, and VMS systems.

E Access control reports shall support cardholder pictures.

F The USP shall support the following types of reports:

01 Alarm report

02 Video-specific reports (archive, bookmark, motion, and more)

03 Configuration reports (cardholders, credentials, units, access rules, readers/inputs/outputs, and more)

04 Activity reports (Cardholder, cardholder group, visitor, credential, door, unit, area, zone, elevator, and more)

05 Health activity and health statistics reports

06 Other types of reports include visitor reports, audit trail reports, incident reports, and time and attendance reports.

G Generic Reports, Custom Reports and Reports Templates

01 A user has the option of generating generic reports from an existing list, generating reports from a list of user-defined templates, or creating a new report or report template.

02 The user shall be able to customize the predefined reports and save them as new report templates. There shall be no need for an external reporting tool to create custom reports and report templates. Customization options shall include setting filters, report lengths, and timeout period. The user shall also set which columns shall be visible in a report. The sorting of reported data shall be available by clicking on the appropriate column and selecting a sort order (ascending or descending).

03 All report templates shall be created within the Surveillance UI.

04 These templates can be used to generate reports on a schedule in PDF or Excel formats.

05 An unrestricted number of custom reports and templates shall be supported.

H A reporting task layout shall consist of panes with settings (report length, filters, go and reset commands, etc.), the actual report data in column format, and a pane with display tiles. The user shall be able to drag and drop individual records in a report onto one or more display tiles to view a cardholder's picture ID, playback a video sequence, or both.

I The USP shall support comprehensive data filtering for most reports based on entity type, event type, event timestamp, custom fields, and more.

J The user shall be able to click on an entity within an existing report to generate additional reports from the Surveillance UI.

K The USP shall support the following actions on a report: Print report, export report to a PDF/Microsoft Excel/CSV file, automatically email a report based on a schedule and a list of one or more recipients.

4.10 Federation: Monitoring of Remote Systems

A The USP shall support the concept of a Federation for access control, video and license plate recognition.

B Federation shall allow multiple independent USP systems (Federated systems) to be unified into a larger virtual system (the Federation). This shall facilitate global monitoring of multiple independent USP systems shall be possible.

C The Federation shall be support the unification of multiple independent video surveillance systems or VMS.

D The Federation shall be support the unification of multiple independent access control systems or ACS.

E Entities that shall be federated and monitored centrally from the Federation shall include: alarms, areas, cameras, cardholders and cardholder groups, credentials, doors, elevators, and zones (monitored inputs).

F The Federation shall support Global Alarm Management from the Surveillance UI for both access control and video.

G The Federation shall support Global Report Generation from the Surveillance UI for both access control and video.

H The Federation shall support dozens of operator actions on remote (federated) entities from the Surveillance UI (e.g. generate a global report taking into account events from multiple independent sites, or acknowledge remote alarms).

4.11 Microsoft Active Directory Integration

A The USP shall support a direct connection to one or multiple Microsoft Active Directory server via the Active Directory Role(s). Active Directory integration shall enable the synchronization of information from the Active Directory server to the USP.

B Active Directory integration shall permit the central management of the USP users, user groups, cardholders, and cardholder groups.

C The USP shall be able to connect to and synchronize data from multiple Active Directory servers (up to 10).

D The USP shall support Microsoft Active Directory encryption using LDAP SSL.

E When enabled, Active Directory shall manage user logon to the USP client applications through the user's Windows credentials. Logon to the USP shall utilize native Active Directory password management and authentication features.

F It shall be possible to synchronize the following USP entities and their information from Active Directory to the USP:

01 Users (username, first and last names, email address, and more)

02 User groups (user group name, description, and group email address)

03 Cardholders (first and last names, description, email, picture and more)

04 Cardholder groups (cardholder group name, description, and group email address)

05 Active Directory attributes to USP custom fields.

G When enabled, the addition, removal, or suspension of a user's Windows account in Active Directory shall result in the creation, deletion, or disabling of the equivalent user account in the USP.

H When enabled, the addition, removal, or suspension of a user's Windows account in Active Directory shall result in the creation, deletion, or disabling of the equivalent cardholder account in the USP.

I Supported synchronization methods for additions, modification, and deletions of synchronized entities shall include: on first logon (users only), manual synchronization, scheduled synchronization.

4.12 Zone Management

A The USP shall support the configuration and management of zones for input point monitoring via the Zone Manager Role. A user shall be able to add, delete, or modify a zone if he has the appropriate privileges.

B A zone shall monitor the status of one or more inputs points. Zone monitoring or input point monitoring shall be possible through the use of a controller and one or more input modules. Inputs from video cameras or video encoders shall also be accessible via a zone.

C Supervised inputs shall be supported depending on the hardware installed. Depending on the input module used, both 3-state and 4-state supervision shall be available.

D A schedule shall be defined for a zone, indicating when the zone will be monitored.

E Custom Events shall provide full flexibility in creating custom events tailored to a zone. Users shall be able to associate custom events to state changes in monitored inputs.

F The ACS shall support one or more cameras per zone. Video shall then be associated to zone state changes.

G Input/Output (IO) Linking

01 Zone management shall support Input/Output (IO) Linking. IO linking shall allow one or more inputs to trigger one or more outputs.

02 IO linking shall be available in offline mode when communication between the server and hardware is not available.

03 Custom Output Behaviors shall provide full flexibility in creating a variety of complex output signal patterns: Simple pulses, periodic pulses, variable duty-cycle pulses, state changes.

04 Through the "trigger an output" action, the ACS shall support the triggering of outputs with custom output behaviors.

4.13 Intrusion Device Integration

A The USP shall integrate with third party intrusion panels and devices via an Intrusion DDK. The Intrusion Manager Role shall manage communications with the intrusion panels. Communications with intrusion devices shall be over serial communications and/or an IP network.

B Integration with intrusion panels shall be possible outside the release cycle of the USP. It shall be possible to add new integrations at any point in time.

C Functionality available via the USPs integration of intrusion devices shall include the following (where supported by the intrusion panel):

01 Arm and disarm intrusion devices (manually, on schedule, following a USP event).

02 Activate or trigger intrusion device outputs.

03 View intrusion events and alarms.

04 Monitor the status, including arming status, of the intrusion devices.

05 Video verification of intrusion events and alarms with video panels.

06 Create USP zones using intrusion device inputs.

D Currently supported intrusion panels include:

01 Bosch G Series panels

02 DSC Power series panels

03 DMP XR Series panels

04 Honeywell Galaxy Dimension panels

4.14 Asset Management Integration

A The USP shall integrate with third party asset management systems via the Asset Management Role.

B Communications with asset management solutions shall be over an IP network (via software communications).

C Functionality available via the USPs integration of asset management systems shall include the following (where supported by the asset management systems):

01 Synchronize asset management system assets with USP asset entities.

02 Live monitoring of asset-related activity events, health events, and activity (asset online, asset offline, asset moves, low battery).

03 Synchronization of asset management alarms with Security Center alarms.

04 Viewing video tied to asset-related activity and alerts within monitoring and reporting tasks.

05 Acknowledge alarms in Security Center which acknowledges alerts in the asset management system and vice versa.

06 Real-time tracking of asset locations on a per area basis.

07 Asset Management Inventory reporting task that details the current location (area) of an asset.

08 Asset Activity reporting task that provides a historical review of asset-related events and activity.

D Currently supported asset management systems include:

01 RF Code Asset Manager

4.15 User and User Group Security, Partitions, and Privileges Management

A The USP shall support the configuration and management of users and user groups. A user shall be able to add, delete, or modify a user or user group if he has the appropriate privileges.

B Common access rights and privileges shared by multiple users shall be defined as User Groups. Individual group members shall inherit the rights and privileges from their parent user groups. User group nesting shall be allowed.

C User privileges shall be extensive in the USP. All configurable entities for the USP, including access control/video/video, shall have associated privileges.

D Specific entities such as cardholders, cardholder groups, and credentials shall include a more granular set of privileges such as the right to access custom fields and change the activation or profile status of an entity.

E Partitions

01 The USP shall limit what users can view in the configuration database via security partitions (database segments). The administrator, who has all rights and privileges, shall be allowed to segment a system into multiple security partitions.

02 All entities that are part of the USP can be assigned to one or more partitions.

03 A user who is given access to a specific partition shall only be able to view entities (components) within the partition he has been assigned. Access to a user is given by assigning the user as an accepted user to view the entities that are members of a particular partition.

04 A user or user group can be assigned administrator rights over the partition.

F It shall be possible to specify user and user group privileges on a per partition basis.

G Advanced logon options shall be available such as dual logon and more.

H It shall be possible to specified an inactivity period for the Surveillance User Interface after which the application automatically lock, but preserves access to currently displayed camera feeds.

4.16 Event/Action Management

A The USP shall support the configuration and management of events for access control, IDS, and video. A user shall be able to add, delete, or modify an action tied to an event if he has the appropriate privileges.

B The USP shall receive all incoming events from one or more ACS and/or VMS. The USP shall take the appropriate actions based on user-define event/action relationships.

C The USP shall receive and log the following events:

01 System-wide events

02 Application events (clients and servers)

03 Area, camera, door, elevator, and IDS events (reads, hits)

04 Cardholder, credential events

05 Unit events

06 Zone events

07 Alarm events

08 First Person in and Last Person Out events, antipassback events.

09 Intrusion events.

10 Asset management events.

D The USP shall allow the creation of custom events.

E The USP shall have the capability to execute an action in response to an access control, video, and LPT event.

F The USP shall allow a schedule to be associated with an action. The action shall be executed only if it is an appropriate action for the current time period.

4.17 Schedules and Scheduled Tasks

A Schedules

01 The USP shall support the configuration and management of complex schedules. A user shall be able to add, delete, or modify a schedule if he has the appropriate privileges.

02 The USP shall provide full flexibility and granularity in creating a schedule. The user shall be able to define a schedule in 1-minute or 15-minute increments.

03 Daily, weekly, ordinal, and specific schedules shall be supported.

B Schedules Tasks

01 The USP shall support scheduled tasks for access control, IDS, and video.

02 Scheduled tasks shall be executed on a user-defined schedule at a specific day and time. Recurring or periodic scheduled tasks shall also be supported.

03 Scheduled tasks shall support all standard actions available within the USP such as sending an email or emailing a report.

4.18 Macros and Custom Scripts

A The USP shall enable users to automate and extend the functionalities of the system through the use of macros or custom scripts for access control, LPR, and video.

B Custom macros shall be created with the USP Software Development Kit (SDK).

C A macro shall be executed either automatically or manually.

D In the Surveillance UI, a macro shall be launched through hot actions.

4.19 Dynamic Graphical Maps (DGM)

A The USP shall support mapping functionality for access control, video surveillance, intrusion detection, and external applications.

B The DGM shall provide the ability to display any type of third party entities integrated through an SDK.

C The DGM shall offer central management and storage of the maps.

D The DGM shall offer built-in map data backup and restore.

E The DGM shall offer failover capabilities.

F The DGM shall provide a mean to update a map background without affecting the map object configuration.

G The DGM shall provide a user friendly and intuitive navigation including:

01 The ability to create maps with hierarchies to facilitate navigation within and between various sites and buildings.

02 The ability to define favorites for recurrent position recall. Favorites shall be public or restricted per user.

03 The possibility to create links between maps.

04 A common user experience regarding navigation into the map for both GIS or private maps.

05 The possibility to zoom in by scrolling the mouse or simply by drawing a region on the map.

H It shall be possible to represent the physical location of areas, cameras, doors, alarms, zones (monitored inputs), intrusion area, digital inputs and outputs.

I It shall be possible to monitor the state of entities on the map. The display of the state on the map shall be customizable and represented by:

01 An icon

02 A colorization of the icon

03 A transparence level of the icon

04 A blinking rate

J The DGM shall display in overlay within the map the video feed of a selected camera

K For PTZ cameras position feedback capabilities, the DGM shall:

01 Dynamically represent the accurate field of view of the camera

02 Allow to act on the PTZ by moving its field of view

L The DGM shall support the use of GIS maps or private maps or a combination of both for map background.

M The DGM shall be compatible with any GIS compliant maps with the OGC and supporting WMS. This includes, but not limited, to ESRI maps. The DGM will allow to select the appropriate GIS layers.

N The DGM shall provide an intuitive built-in map designer for entity positioning on the map using drag and drop. Any configuration shall be graphic.

O It shall be possible to edit and configure multiple map object at once.

P Various actions shall be available within maps for execution through simple and intuitive double-click, right-click, or drag-and-drop functionality. Examples of actions available through maps shall include unlocking a door and acknowledging an alarm.

Q The DGM shall allow the management of the USP alarms from the map:

01 Locate on the map entities related to the alarm

02 Display entities on alarm with a specific icon, color, transparency level, and blinking rate.

03 List, select and locate alarms.

04 Auto center the map on the highest priority alarm

05 Handle the alarm from the map, including acknowledgement, forwarding, investigation.

06 All map containers, such as hotspot or map-link shall reflect the alarm status of the contained entities

R It shall be possible to add advanced functionality to maps object using the SDK. Any functionality available through the USP SDK shall be available within maps.

S The DGM shall offer lasso tools for:

01 Displaying entities of a location in one single action.

02 Selecting and pointing dynamically PTZ to a selected points of interest in the map

03 Triggering an action on all entities of a location in a single click.

04 Editing multiple entities of a location at once.

T The DGM shall allow to display USP entities selected from the map to a remote monitor (video wall)

U DGM shall provide search capabilities:

01 Search within the map by entity name, street name or point of interest.

02 Drag and drop entities from the USP to the map to center on its location.

V The DGM shall allow the use of KML overlay map information for both GIS and private maps. Movable object shall be supported through the use of KML.

W Update of the map content by an administrator shall be immediately and dynamically pushed to all operator displaying the map.

4.20 Audit and User Activity Trails (Logs)

A The USP shall support the generation of audit trails. Audit trails shall consist of logs of operator/administrator additions, deletions, and modifications.

B Audit trails shall be generated as reports. They shall be able to track changes made within specific time periods. Querying on specific users, changes, affected entities, and time periods shall also be possible.

C The USP shall support the generation of user activity trails. User activity trails shall consist of logs of operator activity on the USP such as login, camera viewed, badge printing, video export, etc.

D The ACS shall support the following actions on an audit and activity trail report: print report, export report to a PDF/ Microsoft Excel/CSV file.

4.21 Incident Reports

A Incident reports shall allow the security operator to create reports of incidents that occurred during a shift. Both video-related and access control-related incident reports shall be supported.

B The operator shall be able to create standalone incident reports or incident reports tied to alarms.

C The operator shall be able to link multiple video sequences to an incident, access them in an incident report and being able to change date on time of the sequences later.

D It shall be possible to create a list of Incident categories, tag a category to an incident and filter the search with the category as a parameter.

E Incident report shall allow to create a custom form to intake information on an incident.

F Incident reports shall allow entities, events, and alarms to be added to support the report's conclusions.

4.22 Session Initiation Protocol (SIP) Communication Management (CM)

A An operator of the USP shall be able to initiate and answer calls within the USP User Interface to and from other operator and edge voice devices such as intercoms, emergency call stations, information desks, softphones or phone devices.

B The USP shall support Communication Management between the USP client User Interface and SIP endpoint devices.

C SIP endpoints shall be able to register to the UPS using a standard SIP protocol.

D The USP shall support Communication Management between two SIP endpoint devices.

E The USP shall allow configuration of SIP trunk connections to multiple SIP Servers supporting SIP Trunks.

F The Communication Management shall support management of calls to and from other SIP Servers connected though SIP Trunks.

G The CM is a service of the USP and shall not require the addition of any third party software.

H The CM shall support the following audio compression formats:

01 PCMA (G.711 a-Law)

02 PCMU (G.711 u-Law)

03 G.722

04 G.729

I The CM shall certify SIP devices from the following manufacturers:

01 Commend

02 Vingtor- Stentaphone

J The CM shall allow bidirectional audio and video recording of call sessions. The USP shall offer the following recording capabilities:

01 Automatic cleanup of call session files after a programmable number of days.

02 Deactivation of call recording between operators.

03 Deactivation of Call recording with specific operators.

04 Deactivation of Call recording with specific voice devices.

05 Selection of the storage path for call session recordings.

K The CM shall provide the flexibility for the administrator to define the network ports used to communicate between the USP servers and:

01 USP Operator Client User Interface.

02 SIP devices.

03 SIP servers.

L The CM shall provide the capability to create Ring Groups. A Ring Group is a group of call numbers grouped under a single call number. It shall be possible to set a Ring Group to call simultaneously or sequentially the members of the group. Dwell time for sequence mode shall be configurable.

M The Communication Management shall allow automatic routing of calls through the configuration of a collection of rules (Dial Plan). Dial Plans shall support the following capabilities:

01 Match a phone number with regular expression.

02 Route calls based on matching phone number from which calls are made.

03 Route calls based on matching destination phone number to which calls are made.

04 Change phone extension from which calls are received.

05 Change phone extensions to which calls are sent.

06 A combination of any of the above capabilities in a configured priority and based on a schedule.

N Dial Plans shall be applicable to calls between SIP entities registered to the USP as well as from and to external SIP servers.

O The USP shall unify within a simple user interface, the workflow between the associated security entities of a call session including call box, cameras, doors, intrusion zones and outputs.

P The USP shall support video and audio calls:

01 Between USP Client User Interfaces.

02 From and to USP Client User Interfaces and SIP devices.

03 Between SIP devices.

Q The USP shall provide an advanced and friendly call management user interface that allows operator to:

01 Connect standard USB headsets and webcams to USP Client User Interface workstations, so that USP users can make voice and video calls through the USP Client User Interface.

02 Display the Video associated to the call and switch between multiple video sources.

03 Receive incoming call notifications directly through a notification tray.

04 Initiate, answer, forward, place on hold, or cancel calls from a dedicated call dialog box.

05 Control cameras, doors, zones, and device outputs during a call.

06 Create a customizable list of contacts, so that users can quickly call their contacts. Contact lists include other USP users, as well as SIP devices.

07 Dial a phone number to make a call.

08 Dial a DTF sequence during a call.

09 Monitor the availability status of a user and set its own availability status.

10 Access a history log of calls the operator initiated and received. This log shall show the time of the call, duration, direction and the reason of its ending. It shall be possible to redial one of the entry of the log.

R The USP shall allow an operator to manage up to 10 calls simultaneously. The call queue shall show the status of each call: incoming, in call, on hold. It shall be possible to hold and resume a call directly from the call queue.

S The USP shall offer a call window. It shall be possible within the call windows to:

01 Switch between cameras associated to the call participant.

02 Open and lock doors associated to the call participant.

03 Arm and Disarm zones associated to the call participant.

04 Trigger outputs associated to the call participant.

05 Put on hold, resume, forward, and end a call.

06 Mute the microphone.

07 Hide de webcam video feed.

T The USP shall have a built-in address book. The address book shall be available in the call dialog box, in which users can view and manage their list of contacts. From the address book, users shall be able to do the following:

01 Call a contact by simply double-clicking the contact name.

02 See the availability status of their contacts (users and SIP Devices).

03 Quickly display a contact's information, such as photo, name, and number.

04 Filter their contacts by type (SIP Device or User).

05 Create a list of favorites by adding and removing contacts.

06 Search for and call numbers that appear in the contact list.

U The USP shall provide a graphical dial pad to allow the operator make calls and dial DTMF tones during a call.

V The USP shall provide call reporting capabilities to investigate the activities during specific call sessions. The report shall provide the capability to replay audio recordings and watch call sessions that have associated video. The Call report shall provide filters to query the call records by:

01 Date and time.

02 Call session duration.

03 Involved users and call stations.

04 Call events and actions.

05 Actions taken by a user on doors, intrusion zones and outputs during the call session.

W The USP shall give the capability to export a call session, including bidirectional audio, associated video and log journal of the call session.

X It shall be possible to place the voice devices as icons on a map. Icons on the map shall display the call status of the voice device with a color code. A right-click on the voice device map icon shall allow the user to:

01 Answer or reject an incoming call.

02 Initiate a call to the device.

03 Put on hold and resume a call with the device.

Y It shall be possible for an operator to select and broadcast its availability status, the possible statuses being Available, Away and Busy. This status will appear with a color code in the call dialog of other operators.

END OF SECTION

PART 5 INTEGRATION TOOLKITS

5.01 Software Development Kit (SDK)

A A USP SDK shall be available to support custom development for the platform.

B The SDK shall include functionalities specific to the embedded, access control (ACS), IDS and VMS systems.

C Integration with external applications and databases shall be possible with the SDK.

D The SDK shall enable end-users to develop new functionality (user interface, standalone applications or services) to link the USP to third party business systems and applications such as Badging Systems, Human Resources Management Systems (HRMS), and Enterprise Resource Planning (ERP) systems.

E The SDK shall be based on the .NET framework.

F The SDK shall support dynamic or transactional updates to USP configuration. It shall also support change notification of USP entity configuration.

G The SDK shall provide an extensive list of programming functions to view and/or configure core entities such as: users and user groups, alarms, custom events, and schedules, among others.

H The SDK shall provide an extensive list of programming functions to view and configure ACS and VMS.

I The SDK shall provide an extensive list of programming functions to view and configure most ACS entities such as: cardholders, cardholder groups, visitors, and credentials, access rules (modify only), and custom Fields.

J The SDK shall be able to receive real time events from the USP entities: users and user groups, areas, zones, cameras, video units, doors, door controllers (units), elevators, cardholders, cardholder groups, and credentials.

K The SDK shall be able to query the history of events for areas, cameras, zones, alarm, cardholders, credentials, visitors, doors, query license plate read events, license plate hit events, generate a license plate hits report, generate a license plate reads report.

L The SDK shall support the following alarm functions: view alarms in real time, acknowledge alarms, change priority, change recipient

END OF SECTION

PART 6 VIDEO SURVEILLANCE SYSTEM FUNCTIONALITY

6.01 General

A The VMS shall be based on a true open architecture that shall allow for use of non-proprietary workstation and server hardware, non-proprietary network infrastructure and non-proprietary storage.

B The VMS shall offer a complete and scalable video surveillance solution which allows cameras to be added on a unit-by-unit basis.

C The VMS shall interface with analog-to-digital video encoders and IP cameras and with and digital-to-analog video decoders, hereafter referred to as digital video servers (DVS). The VMS shall support DVS from various manufacturers.

D The VMS shall integrate DVS using the DVS native SDK or using the following industry standards to interface to the DVS.

01 ONVIF

E All video streams supplied from analog cameras or IP cameras shall be digitally encoded in MPEG-4, MPEG-2, MJPEG, H.264, Wavelet or JPEG2000 compression formats and recorded simultaneously in real time.

F All audio streams supplied from IP video servers shall be digitally encoded in g711 (u-law), g721, g723 or AAC compression formats and recorded simultaneously in real time.

G Each camera's bit rate, frame rate and resolution will be set independently from other cameras in the system, and altering these settings will not affect the recording and display settings of other cameras.

H The VMS shall be able to use multiple CCTV keyboards to operate the entire set of cameras throughout the system, including cameras of various manufacturer's brands, including their PTZ functionalities (i.e.: Pelco keyboard controls Panasonic dome or vice-versa).

I The VMS shall be able to retrieve and set the current position of PTZ cameras using XYZ coordinates.

J The VMS shall support PTZ camera protocols from multiple manufacturers including analog and IP protocols.

K The VMS shall arbiter the user conflict on PTZ usage based on user levels per camera

L The VMS shall support the following list of CCTV keyboard protocols:

01 American Dynamics 2078 ASCII, American Dynamics 2088 ASCII

02 Bosch Autodome, Bosch Intuikey

03 DVTel

04 GE ImpactNet

05 Panasonic, Pelco ASCII, Pelco KBD-300, Pelco P

06 Radionics

07 Samsung SSC-1000

08 Videoalarm

M The MVS shall support the following list of joysticks and control keyboards:

01 Axis 295

02 Axis T8310 Video Surveillance Control Board

03 Panasonic WV-CU950 Ethernet keyboard

04 Any USB joystick detected as a Windows Game Controller

N The VMS shall allow for the configuration of a time zone for each camera connected to a DVS. For playback review, users shall have the ability to search for video based on the following options:

01 local time of camera

02 local time of the SSM

03 local time of user's workstation

04 GMT Time

05 other time zone

O Audio and Video storage configuration for the SSM shall either be:

01 Internal or external IDE/SATA/SAS organized or not in a RAID configuration;

02 Internal or external SCSI/iSCSI/Fiber Channel organized or not in a RAID configuration;

03 It shall be possible to include within the overall storage system disks located on external PCs on a LAN or WAN as well as;

04 Network Attached Servers (NAS) on a LAN or WAN as well as;

05 Storage Area Networks (SAN);

P The SSM shall not limit the actual storage capacity configured per server

6.02 Configuration UI

A The Configuration UI shall allow the administrator or users with appropriate privileges to change video configuration.

B The Configuration UI shall provide the ability to change video quality, bandwidth and frame rate parameters on a per camera (stream) basis for both live and recorded video.

C The Configuration UI shall provide the ability to configure brightness, contrast and hue settings for each camera on the same DVS.

D The Configuration UI shall provide the capability to enable audio recording on DVS units that support audio

E The Configuration UI shall provide the ability to change audio parameters, serial port and I/O configuration of individual DVS units

F The Configuration UI shall provide the capability to rename all DVS units based on system topology and add descriptive information to each DVS

G The Configuration UI shall provide the ability to set recording schedules and modes for each individual camera. The recording mode can be:

01 Continuous

02 On motion and Manual

03 Manual only

04 Disabled

H The Configuration UI shall support the creation of schedules to which any of the following functional aspects can be attached:

01 Video quality (for each video stream per camera)

02 Recording (for each camera)

03 Motion detection (for each detection zone per camera)

04 Brightness, Contrast, Hue (for each camera)

05 Camera sequence execution

I The Configuration UI shall support creation of unlimited recording schedules and assign any camera to any schedules.

J The Configuration UI shall detect and warn user of any conflict within assigned schedules

K The Configuration UI shall provide the capability to set a pan-tilt-zoom protocol to a specific DVS serial port and allow mixing domes of various manufacturers within a system.

L User shall have the ability to configure a return to home function after a predefined time of inactivity for PTZ cameras. The inactivity time is configurable from 1 to 7200 seconds.

6.03 Archiving

A The Archiver (role) shall use an event and timestamp database for advanced search of audio/video archives. This database shall be a Microsoft SQL 2008 or Microsoft SQL 2012.

B The Archiver shall protect archived audio/video files and the system database against network access and non-administrative user access.

C The Archiver shall digitally sign recorded video using 248-bit RSA public/private key cryptography.

D The Archiver shall offer a plug and play type hardware discovery service with the following functionalities:

01 Automatically discover DVS units as they are attached to the network.

02 Discover DVS units on different network segments including the Internet and across routers with or without network address translation (NAT) capabilities.

E The Archiver shall have the capacity to configure the key frame interval (I-frame) in seconds or number of frames.

F The Archiver shall provide a pre-alarm and post-alarm recording option that can be set between one second and 5 minutes on a per camera basis.

G Shall provide the functionality of storing of video and audio streams based on triggering events such as:

01 Digital motion detection

02 Digital input activation

03 Macros

04 Through SDK application recording

H The Archiver shall perform video motion detection on each individual camera based on a grid of 1320 motion detection blocks. All of the video motion detection settings are configurable on schedule. A global sensitivity threshold is available to reduce motion detection sensitivity where video signal is noisy or a lot of false hits are incurred. Video motion detection itself can be set into four different modes:

01 Full Screen: All 1320 blocks on screen are activated, a general threshold for the overall motion in the entire image can be set and when reached it can trigger recording and a motion event or a custom event.

02 Full Screen Unit: This is the same as the Full Screen but the motion detection takes place in the DVS.

03 Detection Zone: Six overlapping zones can be defined in the 1320 blocks on screen, each of these zones has its own threshold and when reached each one of them can trigger recording and a motion event or a custom event. Each zone triggering its own event allows for the configuration of directional motion detection events and other complex motion detection logic.

04 Detection Zone Unit: This is the same as the Detection Zone but the motion detection takes place in the DVS and only one zone is supported.

05 Disabled: No motion detection is made on this camera.

I The Archiver shall be able to detect motion in video within 200 milliseconds and not only on key frames.

J The Archiver shall allow for multiple recording schedules to be assigned to a single camera, each schedule shall be created with the following parameters:

01 Recording mode:

a) Continuous

b) On Motion/Manual

c) Manual

d) Disabled

02 Recurrence pattern

a) Once on specific days

b) Specific days on a yearly basis

c) Specific days on a monthly basis

d) Specific days on a weekly basis

e) Daily

K Time coverage

01 All day

02 Specific time range(s)

03 Daytime or nighttime based on the times of sunrise and sunset, automatically calculated from the time of year and a geographical location. Provision shall be given to offset the calculated sunrise or sunset time by plus or minus 3 hours.

L The Archiver shall allow each camera (video source) to be encoded multiple times in the same or different video formats (MPEG-4, MPEG-2, MJPEG, H.264, Wavelet or JPEG2000), limited only by the capabilities of each DVS.

M Whenever multiple video streams are available from the same camera, users shall be free to use any one of them based on their assigned usage. The standard video stream usages are:

01 Live

02 Recording

03 Remote

04 Low resolution

05 High resolution

N The Archiver shall allow the video quality to vary according to predefined schedules. Such schedules shall have the same configuration flexibility as the recording schedules mentioned earlier. The video quality shall be based on, but not limited to, the following parameters:

01 Maximum bit rate

02 Maximum frame rate

03 Image quality

04 Key frame interval

05 etc.

O The Archiver shall have the ability to dynamically boost the quality of the "recording stream" (see previous bullet) based on specific events:

01 When recording is started manually by a user

02 When recording is triggered by a macro, an alarm or detected motion

P The Archiver shall have the capacity to communicate with DVS using 128 bits SSL encryption.

Q The Archiver shall have the capacity to communicate with DVS using HTTPS secure protocol.

R The Archiver shall have the capacity to receive multicast UDP streams directly from the DVS.

S For network topologies that restrict the DVS from sending multicast UDP streams, the Archiver shall redirect audio/video streams to active viewing clients on the network using multicast UDP.

T The Archiver shall have the capacity to redirect audio/video stream to active viewing clients on the network using unicast UDP or TCP.

U The Archiver shall empower the administrator with a full range of disk management options:

V The Archiver shall allow the administrator to choose the disks to use for archiving and to set a maximum quota for each.

W The Archiver shall allow the administrator to spread the archiving of different cameras on different disk groups (groups of disks controlled by the same controller) so that archiving could be carried out in parallel on multiple disks.

X The Archiver shall have the capacity to move video archives to the Azure Cloud. The archives will be moved after a preset number of days.

Y The Archiver shall offer the following options to clean up old archives, on a camera by camera basis:

01 After a preset number of days

02 Deleting oldest archives first when disks run out of space

03 Stop archiving when disks are full

Z The Archiver shall allow important video sequences to be protected against normal disk cleanup routines.

AA Users shall have the following options when protecting a video sequence:

01 Until a specified date

02 For a specified number of days

03 Indefinitely (until the protection is explicitly removed)

BB The Archiver shall allow the administrator to put a cap on the percentage of storage space occupied by protected video.

CC The Archiver shall keep a log and compile statistics on disk space usage.

DD The statistics shall be available by disk group or for the whole Archiver.

EE The statistics shall show the percentage of protected video over the total used disk space.

FF The Archiver shall have the capacity to down-sample video streams for storage saving purposes. The down-sampling options available are the following:

01 For H.264 streams the down-sampling options are: all key frames, 1 fps, 2 sec./frame, 5 sec./frame, 10 sec./frame, 15 sec./frame, 30 sec./frame. 60 sec./frame 120 sec./frame

02 For MPEG-4 streams the down-sampling options are: all key frames, 1 fps, 2 sec./frame, 5 sec./frame, 10 sec./frame, 15 sec./frame, 30 sec./frame. 60 sec./frame 120 sec./frame

03 For MJPEG streams the down-sampling options are: 15 fps, 10 fps, 5 fps, 2 fps, 1 fps, 2 sec./frame, 5 sec./frame, 10 sec./frame, 15 sec./frame, 30 sec./frame, 60 sec./frame 120 sec./frame

GG The Archiver shall support DVS with edge recording capabilities and offer the following capacity:

01 The ability to playback at different speeds the video recorded on the DVS

02 The ability to offload (video trickling) on schedule, on event or manually the video recorded on the DVS to store it on the Archiver.

03 It shall be possible to filter the video that is being offloaded using one or multiple of the following filters:

a) Time interval

b) Playback request

c) Video analytic events

d) Motion events

e) Bookmarks

f) Alarms

g) Input pin events

h) Unit offline events

6.04 Auxiliary Archiver

A The Auxiliary Archiver shall be used to produce redundant archives (video, events, bookmarks) for any camera in the system, on a case by case basis.

B The Auxiliary Archiver shall have the ability to record a camera on a different schedule than the Archiver.

C The Auxiliary Archiver shall have the ability to archive any of the standard video streams for archiving. The standard video stream usages are: Live, Recording, Remote, Low Resolution, and High Resolution.

D The Auxiliary Archiver shall have the capacity to move video archives to the Azure Cloud.

6.05 Standby Archiver

A The Standby Archiver shall act as a replacement Archiver role on hot standby, ready to take over the functions of the primary Archiver role. The failover will occur in less than 1 minute. No action from the user will be required.

B The Standby Archiver assigned to an Archiver role entity shall automatically provide protection for all DVS connected to that Archiver role

C The Standby Archiver shall protect the primary Archiver role against the following failures:

01 Server failure (hardware or software)

02 Storage failure (e.g. Archiver Role detects that it cannot read or write to any of its allocated disks)

D It shall be possible for a single Security Center Server to act as the standby server of multiple Archiver roles.

01 Each Archiver roles shall have priority value if multiple Archiver Roles fail at the same time on the same standby server

E It shall be possible for any Archiver role in the system to be designated as another's standby and vice-versa.

F The Standby Archiver shall have the ability to act as a Redundant Archiver.

G The Redundant Archiver shall maintain an exact copy of everything recorded by the default Archiver, i.e. audio/video archives, events and bookmarks.

H Redundancy shall be configured on a camera by camera basis.

I The Redundant Archiver shall have to ability to use a multicast video stream from the DVS and shall not require an additional connection to any DVS.

6.06 Media Streaming

A The Media Router Role shall be responsible for routing video and audio streams across local and wide area networks from the source (e.g. DVS) to the destination (e.g. CSA).

B The Media Router Role shall support multiple transport protocols such as unicast TCP, unicast UDP, and multicast UDP.

C The Media Router shall support IGMP (Internet Group Management Protocol) to establish multicast group memberships.

01 IGMP v3 including SSM (Source-Specific Multicast) shall be supported.

D The Media Router Role using Redirector Agents shall be responsible to redirect a stream from a source IP endpoint to a destination IP endpoint.

E The Redirector Agents shall be capable of converting a stream from and to any supported transport protocols, i.e.:

01 Multicast UDP to Unicast TCP

02 Multicast UDP to Unicast UDP

03 Unicast TCP to Multicast UDP

04 Unicast UDP to Multicast UDP

F It shall be possible to limit the number of concurrent live and playback video redirections for each Redirector Agent in order to better control the bandwidth across multiple sites.

G It shall be possible to protect the Media Router Role against hardware or software unavailability by configuring another Media Router Role acting as a hot standby server.

H Multiple Redirector Agents shall be used on large VMS installation to increase the service availability and to provide automatic load balancing.

6.07 Video Archives Transfer capabilities

A Archive transfer shall provide the ability to:

01 Transfer video from a server to another server in the same system

02 Transfer video from a federated server to another server

03 Transfer the video from a camera storage to a server

B It shall be possible to program the video transfers on recurrent schedule, trigger it manually or upon connection

C It shall be possible to filter the video of interest for a transfer. The video of interest shall be defined with the following filters:

01 All archives when the camera was offline

02 Alarms

03 Playback request from the edge

04 Video analytics events

05 Motion events

06 Bookmarks

07 Input triggers

08 Time range

D It shall be possible to define the length of video before and after the event used as a filter to define the video of interest.

E The USP shall offer an interface to display all the video archive transfer requests. This interface shall display all the current, requested and scheduled video transfer request. I shall be possible to edit, trigger and cancel Video archive transfer from tis interface

END OF SECTION

PART 7 ACCESS CONTROL SYSTEM FUNCTIONALITY

7.01 General

A The ACS shall be an enterprise class IP access control software solution. It shall be fully embedded within a Unified Security Platform (USP). The USP shall allow the seamless unification of the ACS with an IP video management system (VMS).

B The ACS shall be highly scalable to support configurations consisting of thousands of doors with facilities spanning multiple geographic areas.

C The ACS shall support an unrestricted number of logs and historical transactions (events and alarms) with the maximum allowed being limited by the amount of hard disk space available.

D The ACS shall support a variety of access control functionality, including but not limited to:

01 Controller (Unit) management, door management, elevator management, and area management

02 Cardholder and cardholder group management, credential management, and access rule management

03 Badge printing and template creation.

04 Visitor Management.

05 People counting, area presence tracking, and mustering.

06 Offer a framework for third party hardware integration such as card and signature scanner

7.02 Access Management

A The ACS shall be based on an open architecture able to support multiple access control hardware manufacturers. The ACS shall be able to integrate with multiple non-proprietary interface modules and controllers, access readers, and other third party applications.

B The ACS shall be an IP enabled solution. All communication between the ACS and hardware controllers shall be based on standard TCP/IP protocol.

C Access Manager Role

01 The Access Manager Role shall be the server that synchronizes all access control hardware units under its control, such as door controllers and IO modules. It shall also be able to validate and log all access activities and events when the door controllers and IO modules are online.

02 The Access Manager Role shall maintain the communication link with the hardware controllers under its control. It shall also continuously monitor whether the controllers are online or offline.

03 Synchronization of hardware units shall be automated and transparent to users and shall occur in the background. It shall also be possible to manually synchronize units or on a schedule.

04 The Access Manager Role shall support doors and controllers located within one or more facilities. The Access Server shall support a minimum of 200 readers per computer.

D The Access Server shall store all access events associated with the doors, areas, hardware zones (hardware input points), elevators, and controllers under its direct control.

7.03 Global Cardholder Management

A The ACS shall support global cardholder management and synchronization between a central independent site and remote independent site, all of which can have their own Directory and databases.

B It shall be possible to synchronize the following entities and their configuration data:

01 Cardholders (incl. custom fields)

02 Cardholder groups

03 Credentials

04 Badge templates.

C Cardholders and other synchronized entities can be added centrally and synchronized to remote sites for central cardholder management.

D Cardholders and other synchronized entities can be added at remote sites and synchronized to the central site and other remote sites.

E Shall support a single card per cardholder across all of an organizations sites.

F Manual and scheduled synchronization shall be supported.

7.04 Hardware Compatibility List

A The ACS shall have an open architecture that supports the integration of third party IP-based door controllers and IO modules. The ACS shall simultaneously support mixed configurations of access control hardware from multiple vendors.

B The ACS shall support multiple types of hardware devices: Single-reader controllers, 2-reader controllers, 1- to 64-reader controllers, integrated readers and door controllers, Power-over-Ethernet (PoE) enabled door controllers.

C The ACS shall support most industry standard card readers that output card data using the Wiegand protocol and Clock-and-Data.

D The ACS shall support the following IP-enabled controllers. For a description of the capabilities of the controller, refer to the specific controller's A&E specification and design

01 Genetec Synergis Master Controller,

02 Genetec Synergis Cloud Link

03 HID VertX

04 HID VertX EVO

05 HID Edge

06 HID Edge EVO

07 Mercury controllers and SIO modules

08 Mercury M5 bridge

09 Assa Abloy Aperio RS485 8 to 1 hub

10 Assa Abloy IP locks (no DSR required)

a) Corbin Russwin

b) Sargent Passport

c) Sargent Profile

d) IN120

11 Salto Sallis RS485 and PoE routers

12 Axis A1001

13 STid RS485 readers

14 DDS AS34/TPL4

E The following USB enrollment readers shall be supported:

01 RF Ideas pcProx HID USB reader for enrolling proximity cards

02 RF Ideas AIR ID Enroll iCLASS ID# USB reader for enrolling HID iCLASS cards

03 RF Ideas AIR ID Enroll 14443/15693 CSN USB reader for enrolling a MIFARE card using the CSN (card serial number)

04 RF Idea AIR ID Enroll pcProx Plus w/iCLASS reader for enrolling proximity and iCLASS cards

05 STid STR-W35-E/PH5-5AA

06 HID Omnikey 5x21 USB readers

7.05 Software Functionality

A Seamless Unification with IP Video Management System (VMS)

01 Through the USP (Unified Security Platform), the ACS shall support integration with an IP Video Surveillance System or MVS. Integration with an IP video surveillance system shall permit the user to view live and recorded video.

02 User shall be able to associate one or more video cameras to the following entity types, among others: doors, elevator, and hardware zone (input points).

03 The Surveillance UI shall present a true Unified Security Interface for access control and video surveillance. Advanced live video viewing and playback of archived video shall be available through the Surveillance UI.

04 It shall be possible to view video associated to access control events when viewing a report.

B Controller (Unit) Management

01 The ACS shall support the discovery, configuration, and management of IP enabled controllers and IO modules (hardware units). A user shall be permitted to add, delete, or modify a controller if he has the appropriate privileges.

02 The ACS shall support automatic unit discovery. The user shall set the settings for discovery ports and types of unit discovery and the ACS shall automatically detect all connected devices.

03 Unit Swap Utility. The ACS shall support a unit swap utility to swap out an existing controller with a new controller. The unit swap utility shall avoid the reprogramming of the system whenever a unit is replaced. All logs and events from the old unit are maintained.

04 The ACS shall support preconfiguration of the system prior to the physical hardware installation

C Cardholder and Cardholder Group Management

01 The ACS shall support the configuration and management of cardholders and cardholder groups. A user shall be able to add, delete, or modify a cardholder or cardholder group if he has the appropriate privileges.

02 Custom fields shall be supported for both cardholders and cardholder groups.

03 The ACS shall permit the following activation/expiration options for a cardholder's profile: delayed activation of a cardholder's profile, expiration based on the date of first use of credential, or expiration on a user-defined date

04 It shall be possible to associate a picture to the cardholder's profile. The picture shall be imported from a file, captured with a digital camera, or captured from a video surveillance camera. When a cardholder event occurs, the picture of the cardholder shall be displayed in the Surveillance UI. The ACS shall support multiple standard picture formats.

05 Cardholder groups shall enable the grouping of cardholders to facilitate mass changes to system settings. It shall be possible to assign cardholder groups to access rules, thus avoiding the assignment of one cardholder at a time.

06 It shall be possible to search by picture association, custom fields, names and credential code

07 It shall be possible to select multiple cardholder for immediate deactivation or reactivation

08 The ACS shall support synchronization of cardholders and cardholders group through Active Directory including credential and picture of the cardholders

D Credential Management

01 The ACS shall support the configuration and management of credentials, e.g. access cards and keypad PIN numbers. A user shall be able to add, delete, or modify a credential if he has the appropriate privileges.

02 User shall be able to add Custom Fields (user-defined fields) to credentials. Creating a new credential shall be accomplished either manually or automatically.

03 Automatic creation shall allow the user to create a credential entity by presenting a credential to a selected reader. The ACS shall read the card data and associate it to the credential entity. It shall be possible to automatically enroll any card format (128 bits or less).

04 The ACS shall support multiple credentials per cardholder, without necessitating duplicate cardholder information. The ACS shall automatically detect and prevent attempts to register an already-registered credential.

05 Batch enrollment of credentials shall be supported.

06 The ACS shall provide a workflow for badge issuance and card requests

E Custom Card Formats

01 A custom card format feature shall allow the administrator to add additional custom card formats using an intuitive tool within the Configuration UI. The custom card format tool shall be flexible in the following ways:

a) Once enrolled, new custom card formats shall appear in the card format lists for manual card enrollment.

b) An unrestricted number of additional custom card formats can be added.

c) Supports credential with up to 256 bits

02 The administrator shall be able to set the following options when defining a new format:

a) The order in which card fields appear in the user interface or CSA.

b) Whether a field is hidden from, or visible to an operator.

c) Whether a field is read only or modifiable by an operator.

d) Complex parity checking schemes.

e) The order and location of a field's data. Location can be defined on a bit-by-bit basis

F Badge Designer

01 The badge designer shall allow the creation of badge templates that define the content and presentation format of a cardholder badge to be printed.

02 Badge production shall consist of selecting the credential, the badge template, and clicking print.

03 Batch printing of cards shall be available.

04 The contents of a badge template can include: cardholder's first name, last name, picture, custom fields, bitmap graphics, lines, ovals, rectangles, dynamic text labels linked to custom fields and static text labels, barcodes (Interleaved 2 of 5, Extended Code 39).

05 Copy and paste of badge template objects shall be available.

06 It shall be possible to set the border thickness, border color, fill color of badge objects (content), and the color of text labels.

07 Settings such as object transparency, text orientation, and auto-sizing of text shall be available or transparent to the user.

08 Supported badge formats shall be (portrait and landscape): CR70 (2.875" x 2.125"), CR80 (3.37" x 2.125"), CR90 (3.63" x 2.37"), CR100 (3.88" x 2.63"), and custom card sizes.

09 Dual-sided badges shall be supported.

10 A badge template import and export function shall be available to allow the sharing of badge templates between distinct or independent ACS.

11 Chromakey shall be supported

G Door Management

01 The ACS shall support the configuration and management of doors. A user shall be able to add, delete, or modify a door if he has the appropriate privileges.

02 The ACS shall permit multiple access rules to be associated to a door.

03 The ACS shall support the following forms of authentication: Card Only, Card or Keypad (PIN), or Card and Keypad (PIN). It shall be possible to define a schedule for when Card Only or Card and Keypad authentication modes shall be required.

04 Extended Grant Time. It shall be possible to set an extended grant time on a per-door basis (in addition to the standard grant time). Cardholder properties shall include the option of using the extended grant time. When flagged cardholders are granted access, the door shall be unlocked for the duration of the extended grant time instead of the standard grant time.

05 The ACS shall allow the configuration of relocking mode on doors such as on door open, after a definite time or on door close

06 The ACS shall support the ability to enforce the use of two valid reads from different cardholders to grant access to an area

07 The ACS shall support the ability to enable access rule to other cardholders once a supervisor accesses an area.

08 The ACS shall support the ability to enable unlocking schedule on a door once an employee entered the facility.

09 Reader-less door.

a) The ACS shall support doors configured solely with a lock, a REX, and a door contact but without readers.

b) Implementation of a reader less door shall be possible with the use of standard access hardware IO modules. External hardware such as timers shall not be required.

c) Unlocking schedules shall be programmable for reader less doors.

d) Standard door activity reports shall also be possible with reader less doors.

10 Unlocking schedules and exceptions to unlocking schedules shall be associated to a door. An unlocking schedule shall determine when a door should be automatically unlocked. The ACS shall also support the use of a specific offline unlocking schedule. Exceptions to unlocking schedules shall be used to define time periods during which unlocking schedules shall not be applied, e.g. during statutory holidays.

11 The ACS shall support one or more cameras per door. Video shall then be associated to door access events, e.g. access grant or access denied.

H Elevator Management

01 The ACS shall support the configuration and management of elevators. A user shall be able to add, delete, or modify an elevator if he has the appropriate privileges.

02 The ACS shall be able to control access to specific floors using a reader within the elevator cab. Control shall be available through the use of a controller with an interface to a reader and to multiple output modules with relays.

03 Elevator floor selections shall be tracked using a controller with an interface to multiple input modules. Floor tracking shall be available within an elevator activity report.

04 The elevator control module shall continue to function in offline mode should communication between the ACS and the controller fail.

05 The ACS shall support one or more cameras per elevator cab. Video shall then be associated to elevator access events, e.g. access grant or access denied.

I Visitor Management

01 The ACS shall support the configuration and management of visitors. A user shall be able to enroll or remove a visitor if he has the appropriate privileges. The ACS shall support check-in and check-out of visitors from the Surveillance UI.

02 A visitor check-in wizard shall facilitate the enrollment process, allowing a user to specify the visitor’s specific information.

03 The ACS shall permit the following credential options during visitor check-in:

a) Use an existing credential

b) Automatically create a new credential

c) Manually create a new credential

04 The ACS shall support the creation of a pool of visitor credentials in advance. Existing visitor credentials shall be assigned to visitors during the check-in process.

05 The ACS shall permit cardholder groups to be designated as "available for visitors". Users shall be able to define the access privileges for the cardholder groups (visitor cardholder groups) in advance. During visitor check-in, the user shall select the visitor cardholder group to associate with a visitor. All of the visitor cardholder group access privileges shall be automatically transferred to the visitor. This feature shall permit the creation of multiple types of visitor groups and associated privileges (for contractors, VIPs, day visitors, etc.). Visitors added to visitor cardholder group in the Surveillance UI shall be automatically updated in the Configuration UI cardholder group screen.

06 A visitor's profile shall support the real-time modification of visitor information after a visitor has checked-in.

07 The ACS shall also provide comprehensive visitor tracking and visitor reporting. Through the real-time tracking feature, the ACS shall generate a real-time and historical visitor activity listing in the Surveillance UI. The ACS shall also generate visitor-specific reports that provide comprehensive listings of visitors as well as full details on their movement.

08 It shall be possible to exempt a visitor from any antipassback rules in effect.

09 The operator shall be able to print visitor badges during the check-in process. The printing of both paper badges (visitor without an assigned credential) and actual credentials shall be supported.

10 Visitor management and reporting shall be available through the Web Client as well.

11 It shall be possible to locate a visitor`s information or profile by swiping the visitor`s credential (card) at a USB reader.

12 It shall be possible to tag the person visited to the visitor profile.

13 It shall be possible to require that the visitor requires an escort to enter an area and that escort needs to badge to confirm the access of the visitor.

J People Counting & Area Presence Tracking (Mustering)

01 The ACS shall support people counting (or area presence tracking). The ACS shall be able to monitor and report the number of cardholders in an area in real-time and for all areas. Monitoring shall be based on the entire access control infrastructure, for both local areas and those in remote geographic locations. People Counting can also be used to perform mustering.

02 The ACS shall report area presence counts in the Surveillance UI. Area presence tracks shall dynamically track the total number of cardholders in an area. Displayed data shall be updated dynamically.

03 The ACS shall be able to generate an area presence report listing the cardholders located in one or more areas, accessible through the Surveillance UI. It shall be possible to filter the report by area and time period. The report shall also include activity from sub-areas (nested areas).

04 Through people counting, the ACS shall be able to generate First Person In and Last Person Out events. The First Person In event shall detect when the first cardholder enters an empty area. The Last Person Out event shall detect when the last cardholder leaves an area. It shall be possible to trigger actions from both events such as sending a message or triggering an alarm. Refer to the section Event/Action Management (§5.16) for more information on the event/action mechanism.

05 The ACS shall be able to determine the entry of cardholder based on a dedicated sensor

K Custom Fields (User-Defined Fields)

01 The ACS shall permit the creation of custom fields. Up to 1,000 custom fields shall be supported.

02 Custom fields shall be supported for the following entities: Cardholders, Cardholder groups, Credentials, and Visitors.

03 Supported custom fields include: Text, Integers, Decimal Numbers, Dates, Boolean, and Images (graphics).

04 User shall be able to define a default value for a custom field.

05 The creation of new custom field types shall be possible. New custom field types shall be based on the standard custom fields supported. They shall support user-defined values from which an operator must make a selection.

06 Administrators have the ability to define which users can view and modify specific custom fields. This shall limit the access to custom field data to users with pre-defined privileges. The ACS shall support querying and report generation using custom fields.

07 Custom fields can be grouped and ordered within these groups as defined by the user.

08 Values for custom fields can be imported using the Import Tool.

L Import Tool

01 The ACS shall support an integrated Import Tool to facilitate the import of existing cardholder and credential data. The import of data shall be through the use the CSV file format. The tool shall be available from the Configuration UI.

02 The Import Tool shall also support the ability to manually import data that has been exported from a third party database if it is in CSV format.

03 The import tool shall permit the import of the following data:

a) Cardholder name, descriptions, picture, email, and status

b) Cardholder group information

c) Credential name, status, format, and card number (including credentials with custom formats)

d) Partition information

e) Custom fields

04 Full flexibility in selecting the fields import during an import session shall be available.

05 The option to use a custom and unique cardholder key shall be specified during the import process to ensure that cardholders with duplicate names will not have their data overwritten. Cardholder key generation shall be automated. The end user shall have the option to select which fields will be used to create this unique key, e.g. credential number, custom fields, cardholder name.

06 The ACS shall also support re-importing a CSV file containing new information to update existing information in the ACS database. Re-importing shall enable bulk amendments to existing access control data.

M Web Client

01 The Web Client shall allow users to perform configuration, management, and reporting activities of the ACS.

02 The Web Client shall be accessible through Microsoft Internet Explorer. It shall be a truly thin client. It shall not require the download of any ACS-specific files or executable on the client workstation.

03 Functionality available through the web client includes:

a) Configuration and management of cardholders and cardholder groups

b) Configuration and management of credentials

c) Configuration and management of access rules

d) Badge printing over the network

e) Assignment of access rules to doors and areas

f) Visitor management including visitor check-in and check-out and reporting

g) Advanced reporting

END OF SECTION

PART 8 DEPLOYMENT SERVICES AND SYSTEM COMMISSIONING

8.01 General

A The contractor shall engage the services of the USP vendor to assist in the management of the deployment of the USP at the end-user site on projects that involve:

01 Multiple contractors or subcontractors that will be responsible for deploying the USP at multiple client sites in different geographical regions.

02 Complex enterprise installations involving advanced functionality (e.g. Federation, failover, plugins) and/or multiple systems (e.g. access control, video, IDS) and/or third party integrations.

03 Extensive use of customized solutions/plugins developed by the vendor that will integrate to the USP.

B The USP vendor services shall include Deployment Management and System Configuration, Commissioning and Client Training (1 week minimum, for 5 people).

8.02 Deployment Management Service

A The Deployment Management service from the vendor shall include a Project Manager acting as the single point of contact for all communications between the contractor and the vendor organization and responsible for:

01 Conducting a Risk Assessment of the impact of potential risk factors on the operation of the vendor's USP.

02 Providing a project plan for the deployment of the vendor's USP.

03 Managing the development and deployment of the custom solution components that will integrate to the vendor's USP (if applicable).

04 Providing a scope of work detailing the services to be provided by the vendor to assist in the deployment of the vendor USP.

05 Coordinating and scheduling the vendor field services with the contractor to assist with the deployment of the vendor USP.

06 Providing regular project status updates to the contractor regarding the development of custom solutions (if applicable) and the deployment of the vendor USP.

8.03 System Configuration, Commissioning Service and Client Training

A The System Configuration and Commissioning service from the vendor shall include a Field Engineer responsible for:

01 Assisting the contractor/subcontractor onsite/remote technicians with the configuration and commissioning of the vendor USP at the client site.

02 Conducting a test of the USP following the deployment of the system using real-world operator scenarios to ensure optimal system performance.

03 Providing the contractor with a Service Report detailing the tasks completed during the deployment of the USP at the client site, as well as any recommendations to improve the performance of the USP that must be implemented by the contractor.

04 Providing a knowledge transfer of the vendor's USP to the contractor following the deployment of the USP at the client site.

05 Providing high level training to highly trained clients that will be involved in the installation, integration and deployment of their systems. This training will be more than operator, it will be future programing and administration of their systems by their network and software administrators.

06 The contractor will provide a certified trainer from the USP provider.

END OF SECTION 283100

PART 18 - GENERAL

18.1 SUMMARY

A. Related Documents:
1. Drawings and general provisions of the Subcontract apply to this Section.
2. Review these documents for coordination with additional requirements and information that apply to work under this Section.

B. Section Includes:
1. Fence framework, fabric, and accessories.
2. Excavation for posts.
3. Concrete encasement for posts.
4. Manual gates and related hardware.

C. Related Sections:
1. Division 01 Section "General Requirements."
2. Division 01 Section "Special Procedures."

18.2 REFERENCES

A. General:
1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
3. Refer to Division 01 Section "General Requirements" for the list of applicable regulatory requirements.
Federal Specifications (FS)

B. American Society for Testing and Materials (ASTM)
1. ASTM A123 / A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
2. ASTM C94 / C94M Standard Specification for Ready-Mixed Concrete
3. ASTM D 412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension
4. ASTM D 792 Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
5. ASTM D 1499 Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Plastics
6. ASTM D 2240 Test Method for Rubber Property—Durometer Hardness
7. ASTM F 668 Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain-Link Fence Fabric

18.3 SUBMITTALS

A. Submit under provisions of Division 01 Section "General Requirements."

B. Submit shop drawings and product data.
1. Include accessories, fittings, hardware, anchorages, and schedule of components.

C. Manufacturer's installation instructions.

PART 19 - PRODUCTS

19.1 MATERIALS

A. Vinyl Fencing: Materials for vinyl-coated chain link fence shall be as specified herein. Material shall be of the same color of vinyl coating. Painted finishes are not acceptable. The color for this job is the manufacturer's standard black as approved by the University.

B. Posts

C. Fabric

D. Accessories

E. Gates

19.2 COMPONENTS

A. Top, Bottom and Brace Rail: 1.660-inch (42.16 mm) outside diameter, plain end, sleeve coupled galvanized steel pipe.

B. Gate Frame: 1.9-inch (48.26 mm) outside diameter Schedule 40 galvanized steel pipe for fittings and truss rod fabrication.

C. Fabric/Vinyl Coated Steel: Chain link fence fabric shall be galvanized steel wire with a continuously bonded vinyl coating, with a finish size (i.e., size after coating) of 8 gauge, and shall comply with ASTM F 668. Fabric height shall be 8 feet (2.44 m) , +/- 3/4 inch (20 mm), with knuckled, selvage edges on the bottom and top. Mesh shall be vertically-woven diamond mesh, with a nominal distance of 2 inches (50 mm) between parallel wires.

D. Tension Bars: 3/16 inches by 3/4-inch (4.76 mm by 20 mm) galvanized steel flat bars.

E. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings shall be galvanized steel.

F. Extension Arms: Cast steel, to accommodate 3 strands of barbed wire, single arm, 12-inches (305 mm) high (measured vertically) above the top edge of the fence fabric, sloped to 45 degrees.

G. Barbed Wire: 12-AWG wire, 3 strands, zinc-coated steel with bonded vinyl coating and 4 point barbs at 5-inches (127 mm) O.C., painted black.

H. Gate Hardware: Fork type latch with gravity drop; center gate stop and drop rod; three 180 degree gate hinges per leaf.

19.3 FINISHES

A. Galvanized Surfaces: Galvanize surfaces in accordance with ASTM A 123, with a coating of at least 1.20 oz/sq. ft.

B. Accessories and Components: Same finish as fabric.

PART 20 - EXECUTION

20.1 INSTALLATION

A. Install framework, fabric, accessories, and gates.

B. Install security fence of 8-foot (2.45 m) fabric height with 1-foot (0.9 m) barbed extension on support arms as shown on Drawings.

C. Space line posts at intervals not exceeding 10 feet (3 m).

D. Set gate and posts plumb, in concrete footings with top of footing 1 inch (25 mm) above finish grade. Slope top of concrete for water runoff. Footings for line end and corner posts are to be 8 inches (203) diameter by 3 feet (0.09 m) deep below finish grade and for gates are to be 12 inches (305 mm) diameter by 3 feet 6 inches (1 m) deep below finish grade.

E. Provide top rail through line-post tops and splice with 7-inch (178 mm) long rail sleeves.

F. Brace each gate and corner post back to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail, one bay from end and gate posts.

G. Install center and bottom brace rail on corner and gate leaves.

H. Stretch fabric between terminal posts or at intervals of 100 feet (30,5 m) maximum, whichever is less.

I. Position bottom of fabric to no more than 2 inches (50 mm) above concrete or asphalt grade and touching dirt finish grade.

J. Fasten fabric to top rail, line posts, braces, and bottom tension wire with 11-AWG galvanized wire ties 24 inches (610 mm) maximum on centers.

K. Attach fabric to end, corner, and gateposts with tension bars and tension bar clips.

L. Install bottom rail supported at each line and terminal post in such a manner that a continuous brace between posts is formed.

M. Install gates with fabric and barbed wire overhang to match fence. Install three hinges per leaf, latch, catches, drop bolt, foot bolts and sockets.

20.2 GROUNDING

A. 40 feet (13 m) on either side of overhead high voltage electrical transmission lines the fence is to be grounded as shown on the Drawings.

20.3 CONSTRUCTION WASTE MANAGEMENT

A. Conform with Division 01 Section “Construction Waste Management.”

B. Before concrete pours, designate locations or uses for excess concrete and a location for clean out water from concrete trucks. Designated locations shall meet environmental standards and conform with Section 7-1.01 of CALTRANS.

END OF SECTION 323113

CONTRACT

THIS CONTRACT made and entered into this_____ day of _____, 20___, by and between _____, as Party of the First Part, hereinafter designated as the CONTRACTOR, and

the City of Norman, a municipal corporation, hereinafter designated as the CITY, Party of the Second Part.

W I T N E S S E T H

WHEREAS, the CITY has caused to be prepared in accordance with law, specifications, and other bidding documents for the work hereinafter described and has approved and adopted all of said bidding documents, and has caused Notice to Bidders to be given and advertised as required by law, and has received sealed proposals for the furnishing of all labor and materials for the following project:

ACCESS CONTROL SYSTEM CONSOLIDATION AND DOOR REPLACEMENT PROJECT FOR THE MUNICIPAL BUILDING AND FLEET MANAGEMENT

as outlined and set out in the bidding documents and in accordance with the terms and provisions of said CONTRACT; and,

WHEREAS, the CONTRACTOR in response to said Notice to Bidders, has submitted to the CITY on the manner and at the time specified, a sealed proposal in accordance with the terms of this Contract; and,

WHEREAS, the CITY, in the manner provided by law, has publicly opened, examined, and canvassed the proposals submitted and has determined and declared the above-named CONTRACTOR to be the lowest and best Bidder on the above-prepared project, and has duly awarded this CONTRACT to said CONTRACTOR, for the sum named in the proposal, to wit: _____ Dollars ($_____); The CONTRACTOR'S bid is hereby made a part of this Agreement.

NOW, THEREFORE, for and in consideration of the mutual agreements, and covenants herein contained, the parties to this CONTRACT have agreed, and hereby agree, as follows:

1) The CONTRACTOR shall, in a good and first-class, workman-like manner at his own cost and expense, furnish all labor, materials, tools, and equipment required to perform and complete said work in strict accordance with this CONTRACT and the following CONTRACT Documents: The Bid Notice published in the Norman Transcript, the Notice to Bidders, Instruction to Bidders, the Contractor's Bid or Proposal, the Construction Drawings, Specifications, Provisions, and Bonds thereto, all of which documents are on file in the Office of the Purchasing Agent of the City of Norman, and are made a part of this CONTRACT as fully as if the same were set out at length.

2) The CITY shall make payments minus a retainage of 20 percent as stipulated in the contract documents to the CONTRACTOR in the following manner: On or about the first day of each month, the City of Normans Project Manager and the Contractor will put together a “PENCIL COPY” of the progress on the project’s, will make accurate

estimates of the value, based on CONTRACT prices, or work done, and materials incorporated in the work and of materials suitably stored at the site during the preceding calendar month. The CONTRACTOR shall furnish to the project manager, or other appropriate person, such detailed information as he may request to aid him as a guide in the preparation of the monthly estimates. The pencil copy document shall represent the full and complete payment request by the contractor for the previous 30-day period. If both parties agree to the Dollar and percent complete shown in the pencil copy document an official invoice less retainage will be submitted to the City of Norman for payment to the Contractor. This invoice will be paid within 30 days less retainage. The last invoice from the Contractor will be for the release of Retainage for these two projects. Retainage will equal 20 percent of the total contract value including all change orders and Alternate bid dollar amounts.

Materials and/or services purchased by CONTRACTOR in connection with the City project shall be subject to the payment of City sales tax. The Contractor will be appointed to be an agent of the City by City Council resolution, thereby exempting material purchases for the project from the payment of City sales tax, CONTRACTOR shall certify, in writing, on the copy of the invoice or sales ticket to be retained by said CONTRACTOR that the purchases are made for and on behalf of the City in accordance with 68 O.S. 1356, paragraph 10.

Each monthly estimate for payment must contain or have attached an affidavit in accordance with the Constitution of the State of Oklahoma, Title 74, Section 3109-3110, and Title 62, Section 310.09. This document is included in this package for review.

On completion of the work, but prior to the acceptance thereof by the CITY, it shall be the duty of the project manager, or other appropriate person, to determine that said work has been completely and fully performed in accordance with said CONTRACT Documents; and upon making such determinations said official shall make his final certificate to the CITY.

The CONTRACTOR shall furnish proof that all claims and obligations incurred by him in connection with the performance of said work have been fully paid and settled; said information shall be in the form of an affidavit, which shall bear the approval of the surety on the CONTRACT Bonds for payment of the final estimate to the CONTRACTOR; thereupon, the final estimate (including retainage) will be approved and paid.

3) It is further agreed that the CONTRACTOR will commence said work within 10 days following receipt of a NOTICE-TO-PROCEED, and prosecute the same vigorously and continuously, and complete the same_____calendar days following receipt of said NOTICE-TO-PROCEED.

4) That the CITY shall pay the CONTRACTOR for the work performed as follows:

a. Payment application shall be submitted every thirty days. After approval of payment application, the invoice will be processed by the City for payment within thirty days less retainage.

b. Construction items specified in the Contractors submittals will be audited to make sure all quantities and part numbers match what was submitted and specified.

Should any defective work or materials be discovered or should a reasonable doubt arise at to the quality of any work completed, there will be deducted from the next estimate an amount equal to the value of the defective or questionable work and shall not be paid until the defects or differences are remedied.

5) That the CONTRACTOR will not undertake to furnish any materials or to perform any work not specifically authorized under the terms of this Agreement unless additional materials or work are authorized by written Change Order, executed by the CITY; and that in the event any additional work is provided by the CONTRACTOR without such authorization, the CONTRACTOR shall not be entitled to any compensation therefore whatsoever.

6) That if any additional work is performed or additional materials provided by the CONTRACTOR upon authorization by the CITY, the CONTRACTOR shall be compensated as agreed to by both parties in the execution of the Change Order.

7) That the CONTRACTOR shall perform the work and provide the materials strictly in accordance with the specifications as to quality and kind and all work and materials shall be subject to rejection by the CITY through its authorized representatives for failure to meet such requirements, and in the event of such rejection, the CONTRACTOR shall replace the work and materials without compensation therefor by the CITY.

8) The CONTRACTOR shall complete the work in accordance with the terms of this Agreement. The CONTRACTOR further agrees to pay as liquidated damages as stipulated in the contract document General Conditions for each calendar day thereafter.

9) The CONTRACTOR shall furnish surety bonds and certificate of insurance as specified herein which bonds and insurance must be approved by the CITY prior to issuance of the Work Order and commencement of work on the project.

10) IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed, in three (3) duplicate originals, the day and year first above written.

To that end, no provision of this CONTRACT or of any such aforementioned document shall be interpreted or given legal effect to create an obligation on the part of the CITY to third persons, including, by way of illustration but not exclusion, sureties upon performance bonds, payment bonds or other bonds, assignees of the CONTRACTOR, subcontractors, and persons performing labor, furnishing material or in any other way contributing to or assisting in the performance of the obligations of the CONTRACTOR; nor shall any such provisions be interpreted or given legal effect to afford a defense against any obligation owed or assumed by such third person to the CITY or in any way to restrict the freedom of the CITY to exercise full discretion in its dealing with the Contractor.

12) The sworn, notarized statement below must be signed and notarized before this Contract will become effective.

STATE OF_____)
COUNTY OF_____)

_____, of lawful age, being first duly sworn, on oath says that (s)he is the agent authorized by CONTRACTOR to submit the above CONTRACT to the CITY. Affiant further states that CONTRACTOR has not paid, given or donated or agreed to pay, give, or donate to any officer or employee of the CITY any money or other thing of value, either directly or indirectly, in the procuring of the CONTRACT.

_____

Submitted and sworn to before me this _____day of _____, 20___.

_____
Notary Public

My Commission Expires:

_____

IN WITNESS WHEREOF, the said parties of the First and Second Part have hereunto set their hands and seals respectively the _____day of _____, 20_____, and the ____day of _____, 20___.

(Corporate Seal) (where applicable)

_____
Principal

ATTEST:

Signed:_____

Authorized Representative

_____
Corporate Secretary (where applicable)

_____
Title

Address:

Telephone:

_____

_____

_____

CITY OF NORMAN

Approved as to form and legality this_____ day of_____, 20___.

_____
City Attorney

Approved by the City Council of the City of Norman this_____ day of _____, 20___.

ATTEST:

_____
City Clerk

_____
Mayor

CITY OF NORMAN
M A I N T E N A N C E B O N D

Know all men by these present that _____, as Principal, and _____,a corporation organized under the laws of the State of _____, and authorized to transact business in the State of Oklahoma, as SURETY, are held and firmly bound unto the CITY OF NORMAN, OKLAHOMA, a Municipal Corporation of the State of Oklahoma, herein called CITY, in the sum of _____ DOLLARS ($_____), for the payment of which sum PRINCIPAL and SURETY bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally.

WHEREAS, the conditions of this obligation are such that the PRINCIPAL, being the lowest and best bidder on the following project:

ACCESS CONTROL SYSTEM CONSOLIDATION AND DOOR REPLACEMENT PROJECT FOR THE MUNICIPAL BUILDING AND FLEET MANAGEMENT

has entered into a written CONTRACT (K-1516-61) with THE CITY OF NORMAN, dated _____, ____ for the erection and construction of this PROJECT, that CONTRACT being incorporated herein by reference as if fully set forth; and,

WHEREAS, under the ordinances of the CITY, the PRINCIPAL is required to furnish to the CITY a maintenance bond covering said construction of this PROJECT, the bond to include the terms and provisions hereinafter set forth, as a condition precedent to final acceptance of the PROJECT.

NOW THEREFORE, if the PRINCIPAL shall keep and maintain, subject to normal wear and tear, the construction, except for defects not occasioned by improper workmanship, materials, or failure to protect new work until it is accepted, and if the PRINCIPAL shall promptly repair, without notice from the CITY any and all defects arising from improper workmanship, materials, or failure to protect new work until it is accepted; all for a period of one (1) year from the date of the written final acceptance by the CITY, then this obligation shall be null and void. Otherwise, this obligation shall remain in full force and effect at all times.

Provided further, however, that upon neglect, failure or refusal of the PRINCIPAL to maintain or make any needed repairs upon the construction on the PROJECT, as set out in the preceding paragraph, within ten (10) days after the mailing of notice to the PRINCIPAL by letter deposited in the United States Post Office at Norman, Oklahoma, addressed to the PRINCIPAL at the address set forth below, then the PRINCIPAL and SURETY shall jointly and severally be liable to the CITY for the cost and expense for making such repair, or otherwise maintaining the said construction.

If is further expressly agreed and understood by the parties hereto that no changes or alterations in said CONTRACT and no deviations from the plan or mode of procedure herein fixed shall have the effect of releasing the sureties, or any of them, from the obligations of this Bond.

IN WITNESS WHEREOF, the said PRINCIPAL has caused these presents to be executed in its name and its corporate seal (where applicable) to be hereunto affixed by its duly authorized representative(s), on the day _____of _____, 20__, and the SURETY has caused these presents to be executed in its name its corporate seal to be hereunto affixed by its authorized representative(s) on the day of _____, 20___.

(Corporate Seal) (where applicable)

_____
Principal

ATTEST:

Signed:_____
Authorized Representative

_____
Corporate Secretary (where applicable)

_____
Title
Address: _____
Telephone:_____

(Corporate Seal) (where applicable)

_____
Surety

ATTEST:

Signed: _____
Authorized Representative

_____
Corporate Secretary (where applicable)

_____
Title
Address:_____
Telephone:_____

CORPORATE ACKNOWLEDGMENT

STATE OF OKLAHOMA _____)
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____day of _____,
20___, by _____ (Name & Title) of
_____, a _____
corporation, on behalf of the corporation.

WITNESS my hand and seal this ___day of _____, 20___.

_____
Notary Public

My Commission Expires: _____

INDIVIDUAL ACKNOWLEDGMENT

STATE OF OKLAHOMA_____)
COUNTY OF _____)

The foregoing instrument was acknowledged before me this ____day of _____, 20__, by _____ of _____, (Name and Title) of _____.

WITNESS my hand and seal this ____day of _____, 20___.

_____
Notary Public

My Commission Expires: _____

PARTNERSHIP ACKNOWLEDGMENT

The foregoing instrument was acknowledged before me this ____day of _____, 20__, by _____ partner (agent) on behalf of _____, a partnership.

WITNESS my hand and seal this ____day of _____, 20___.

_____
Notary Public

My Commission Expires: _____

CITY OF NORMAN

Approved as to form and legality this____ day of _____, 20___.

_____
City Attorney

Approved by the CITY OF NORMAN this____ day of _____, 20___.

ATTEST:

_____ _____
City Clerk Mayor

P E R F O R M A N C E B O N D

Know all men by these presents, that _____ as PRINCIPAL, and _____, a corporation organized under the laws of the State of _____, and authorized to transact business in the State of Oklahoma, as SURETY, are held and firmly bound unto THE CITY OF NORMAN, a Municipal Corporation of the State of Oklahoma, herein called CITY, in the sum of _____ DOLLARS, ($_____), for the payment of which sum PRINCIPAL and SURETY bind themselves, their heirs, executors, administrators, successors and assigns jointly and severally.

WHEREAS, the conditions of this obligation are such that the PRINCIPAL, being the lowest and best Bidder on the following project:

ACCESS CONTROL SYSTEM CONSOLIDATION AND DOOR REPLACEMENT PROJECT FOR THE MUNICIPAL BUILDING AND FLEET MANAGEMENT

has entered into a written CONTRACT (K-1516-61) with THE CITY OF NORMAN, dated _____ _____, _____ for the erection and construction of this PROJECT, that CONTRACT being incorporated herein by reference as if fully set forth.

NOW, THEREFORE, if PRINCIPAL shall, in all particulars, well and truly perform and abide by said CONTRACT and all specifications and covenants thereto; and if the PRINCIPAL shall promptly pay or cause to be paid all indebtedness incurred for labor and materials and repairs to and parts for equipment furnished in the making of this PROJECT, whether incurred by the PRINCIPAL or subcontractors; and if the PRINCIPAL shall protect and hold harmless the CITY form all loss, damage, and expenses to life or property suffered or sustained by any person, firm, or corporation caused by PRINCIPAL or his or its agents, servants, or employees in the construction of the PROJECT, or by or in consequence of any negligence carelessness or misconduct in guarding and protecting the same, or from any act or omission of PRINCIPAL of his or its agents, servants, or employees; and if the PRINCIPAL shall protect and save the CITY harmless form all suits and claims of infringement or alleged infringement or patent rights or processes, then this obligation shall be null and void. Otherwise this obligation shall remain in full force and effect.

It is further expressly agreed and understood by the parties hereto that no changes or alterations in the CONTRACT and no deviations from the plan or mode of procedure herein fixed shall have the effect of releasing the sureties, or any of them, from the obligations of this Bond.

It is further expressly agreed that the PRINCIPAL's obligations under this Bond include payment of not less than the prevailing hourly rate of wages as established by the Commissioner of Labor or as determined by a court on appeal.

IN WITNESS WHEREOF, the PRINCIPAL has caused these presents to be executed in its name and its corporate seal (where applicable) to be hereunto affixed by its duly authorized representative(s), and the _____day of _____, 20__, and the SURETY has caused these presents to be executed in its name and its corporate seal to be hereunto affixed by its authorized representative(s) on the _____day of _____, 20___.

(Corporate Seal) (where applicable)

_____
Principal

ATTEST:

Signed:_____
Authorized Representative

_____
Corporate Secretary (where applicable)

_____
Title

Address: _____
Telephone:_____

(Corporate Seal) (where applicable)

_____
Surety

ATTEST:

Signed: _____
Authorized Representative

_____
Corporate Secretary (where applicable)

_____
Title

Address:_____
Telephone:_____

CORPORATE ACKNOWLEDGMENT

STATE OF OKLAHOMA _____)
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____day of _____, ____, by _____(Name & Title) of _____ _____, a corporation, on behalf of the corporation.

WITNESS my hand and seal this ___day of _____, 20___.

_____
Notary Public

My Commission Expires: _____

INDIVIDUAL ACKNOWLEDGMENT

STATE OF OKLAHOMA_____)
COUNTY OF _____)

The foregoing instrument was acknowledged before me this ____day of _____, 20__, by _____ of _____, (Name and Title) of _____.

WITNESS my hand and seal this ____day of _____, 20___.

_____
Notary Public

My Commission Expires: _____

PARTNERSHIP ACKNOWLEDGMENT

The foregoing instrument was acknowledged before me this ____day of _____, 20__, by _____ partner (agent) on behalf of _____, a partnership.

WITNESS my hand and seal this ____day of _____, 20___.

_____
Notary Public

My Commission Expires: _____

CITY OF NORMAN

Approved as to form and legality this____ day of _____, 20___.

_____
CITY Attorney

Approved by the CITY OF NORMAN this____ day of _____, 20___.

ATTEST:

_____ _____
City Clerk Mayor

S T A T U T O R Y B O N D

Know all men by these presents that _____, as PRINCIPAL, and _____, a corporation organized under the laws of the State of _____, and authorized to transact business in the State of Oklahoma, as Surety, are held and firmly bound unto the State of Oklahoma in the sum of _____ DOLLARS ($ _____), for the payment of which sum PRINCIPAL and SURETY bind themselves, their heirs executors, administrators, successors and assigns jointly and severally.

WHEREAS, the conditions of this obligation are such, that the PRINCIPAL, being the lowest and best bidder on the following PROJECT:

ACCESS CONTROL SYSTEM CONSOLIDATION AND DOOR REPLACEMENT PROJECT FOR THE MUNICIPAL BUILDING AND FLEET MANAGEMENT

has entered into a written CONTRACT (K-1516-61) with THE CITY OF NORMAN, dated _____, 20__for the erection and construction of this PROJECT, that CONTRACT being incorporated herein by reference as if fully set forth.

NOW, THEREFORE, if the PRINCIPAL, shall properly and promptly complete the work on this PROJECT in accordance with the CONTRACT, and shall well and truly pay all indebtedness incurred for labor and materials and repairs to a parts for equipment furnished in the making of the PROJECT, whether incurred by the PRINCIPAL, his subcontractors, or any material men, then this obligation shall be void. Otherwise this obligation shall remain in full force and effect. If debts are not paid within thirty (30) days after the same becomes and due and payable, the person, firm, or corporation entitled thereto may sue and recover on this Bond, subject to the provisions of 61 O.S. 1981 S2, for the amount so due and unpaid.

It is further expressly agreed and understood by the parties hereto that no changes or alterations in said CONTRACT and no deviations from the plan or mode of procedure herein fixed shall have the effect of releasing the SURETIES, or any of them, from the obligation of this Bond.

It is further expressly agreed that the PRINCIPAL'S obligations under this Bond include payment of not less than the prevailing hourly rate of wages as established by the Commissioner of Labor of the State of Oklahoma and by the Secretary of the U.S. department of Labor or as determined by a court on appeal.

IN WITNESS WHEREOF, the PRINCIPAL has caused these presents to be executed in its name and its corporate seal (where applicable) to be hereunto affixed by its duly authorized representative(s), on the ____day of _____, 20___, and the SURETY has caused these presents to be executed in its name and its corporate seal to be hereunto affixed by its authorized representative on the ____day of _____, 20___.

(Corporate Seal) (where applicable)

_____
Principal

ATTEST:

Signed:_____
Authorized Representative

_____
Corporate Secretary (where applicable)

_____
Title
Address: _____
Telephone:_____

(Corporate Seal) (where applicable)

_____
Surety

ATTEST:

Signed: _____
Authorized Representative

_____
Corporate Secretary (where applicable)

_____
Title

Address:_____
Telephone:_____

CORPORATE ACKNOWLEDGMENT

STATE OF OKLAHOMA)
COUNTY OF _____)

The foregoing instrument was acknowledged before me this ____ day of _____, 20_____, by _____ (Name and Title) of _____, a _____ corporation, on behalf of the corporation.

WITNESS my hand and seal this ____day of _____, 20___.

_____
Notary Public

My Commission Expires: _____

INDIVIDUAL ACKNOWLEDGMENT

STATE OF OKLAHOMA_____)
COUNTY OF _____)

The foregoing instrument was acknowledged before me this ____day of _____, 20 , By _____ of _____, (Name and Title) of _____.

WITNESS my hand and seal this ____day of _____, 20___.

_____
Notary Public

My Commission Expires: _____

PARTNERSHIP ACKNOWLEDGMENT

The foregoing instrument was acknowledged before me this ____day of _____, 20 , by _____ partner (agent) on behalf of _____, a partnership.

WITNESS my hand and seal this ____day of _____, 20___.

_____
Notary Public

My Commission Expires: _____

CITY OF NORMAN

Approved as to form and legality this ____ day of _____, 20___.

_____
City Attorney

Approved by the CITY OF NORMAN this ____ day of _____, 20___.

ATTEST:

_____ _____
City Clerk Mayor

AFFIDAVIT

State of _____ P.O. No. _____
County of _____ Invoice No. _____
Amount _____

The undersigned CONTRACTOR, of lawful age, being duly sworn, on oath says that this invoice or claim is true and correct and that (s)he is authorized to submit the invoice pursuant to an approved Contract. Affiant further states that the work as shown by this invoice have been completed in accordance with the plans, specifications furnished the Affiant. Affiant further states that (s)he has made no payment, given, or donated or agreed to pay, give or donate, either directly or indirectly, to any elected official, officer or employee of the CITY OF NORMAN, or money or any other thing of value to obtain payment of the invoice or procure award of this Contract order pursuant to which an invoice is submitted.

_____
Company

_____
By: Architect, Contractor, Supplier
Engineer or Supervisory Official

Subscribed and sworn to before me this ____ day of _____, 20___.

_____
Notary Public(or Officer having Power
to Administer Oaths)

My Commission Expires: _____, 20___.

THIS FORM MUST BE COMPLETED AND SUBMITTED BEFORE ANY INVOICE OVER $12,500.00 CAN BE PROCESSED FOR PAYMENT.